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A REVISION OF  
MESOAMERICAN  
*PSYCHOTRIA* SUBGENUS  
*PSYCHOTRIA* (RUBIACEAE),  
PART II: SPECIES 17–47<sup>1</sup>

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Clement W. Hamilton<sup>2</sup>

GROUP 3. THE *GRACILIFLORA* GROUP

*Shrub* or sometimes small tree; young stems glabrous or sometimes ferruginous-pubescent; stipules sheathing or not, triangular or ovate or lanceolate, the apex often bifid or biaristate (Fig. 2f), uniform in color, glabrous or less commonly fringed or ferruginous-puberulent, caducous. *Leaf* blades usually elliptic, sometimes narrowly so, or oblanceolate or slightly obovate, drying reddish or greenish gray, brown, or black; secondary veins 3–14(–16) pairs, diverging (45°–)55°–90°(–100°), eucamptodromous or brochidodromous, with collector vein only in *P. jimenezii*, the axils with domatia (Fig. 4b) or not (with tufts of hair only occasionally in *P. bakeri*); tertiary veins orthogonal reticulate (sometimes percurrent in *P. marginata*). *Inflorescences* panicles of cymes or rarely (*P. bakeri* and sometimes *P. parvifolia*) of glomerules, usually pedunculate; secondary axes usually in 1 pair per rank, if more than 1 pair then size-differentiated, often delicate or diffuse in structure and diverging at right angles (Fig. 7h); bracts rarely conspicuously enlarged (to 6 mm long in *P. jimenezii*). *Corolla* tubes (1.5–)2–4(–5) mm long (Fig. 8), the lobes usually without apical extensions (sometimes with blunt protuberances in *P. graciliflora*). *Fruit* when dry usually ellipsoid to spherical (obloid in *P. philacra*); persistent calyx a beak or not evident; seed dorsal surface with 3–5 (6–8 in *P. parvifolia*) usually deep longitudinal furrows (Fig. 10d), the ventral surface with 2 deep or broad longitudinal furrows (plus several irregular furrows in both surfaces in *P. philacra*; ventral surface often concave in *P. graciliflora* [Fig. 10c]).

The most commonly encountered species in the group, *Psychotria marginata* (distribution, Fig. 20), does not obviously closely resemble any other species. *Psychotria graciliflora* (Fig. 21), the other widespread species, is the centerpiece of the

morphologically cohesive *P. graciliflora* complex, which includes also *P. bakeri* (Los Santos, Panama), *P. laselvensis* (Costa Rica), *P. liesneri* (eastern Panamá Province), *P. orosiana* (Costa Rica and Panama), *P. parvifolia* (Costa Rica and western Panama), and *P. philacra* (eastern Darién Province; see Fig. 22). *Psychotria jimenezii*, a Costa Rican species (Fig. 23), is unique in the group in having a collector vein, inflorescence bracts as long as 4–6 mm, and seed dorsal surface with usually only three longitudinal furrows, but it too may belong to the *P. graciliflora* complex.

Of the nine species in the group, six appear distylous. All six show between-morph asymmetry in floral part lengths: *Psychotria graciliflora*, *P. jimenezii*, *P. laselvensis*, *P. marginata*, and *P. parvifolia* have longer-exserted parts in pins than in thrums, and in *P. orosiana* pin reproductive organs are longer at both levels. The only positively derived state is seen in *P. liesneri*, which is long-homostylous. Available flowering material of *P. bakeri* and *P. philacra* is insufficient to determine their breeding systems.

**17. *Psychotria bakeri*** Dwyer, Ann. Missouri Bot. Gard. 67: 347. 1980. TYPE: Panama. Los Santos: Loma Prieta, Cerro Grande, 720–840 m, 8 June 1967 (fl), Lewis et al. 2249 (holotype, MO; isotypes, F, GH). Figure 22.

*Shrub* to 1.5 m; young stems glabrous, the bark smooth; stipules sheathing, the sheath 2.5 mm long, biaristate with extensions 2–3 mm long, glabrous, caducous, leaving a red-brown ridge. *Leaves* petiolate; petioles 3–5 mm long, glabrous, flat above; blades membranous, narrow-elliptic, the apex acute, the base attenuate, (3–)4.5–7 × 1–1.6 cm, glabrous above and below, drying pale red-brown; secondary veins 6–7 pairs, diverging 45°–55°, brochidodromous, arcuate near margin, not elevated, glabrous, the axils occasionally with minute

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<sup>1</sup> Part I: Introduction and Species 1–16 appears in the preceding issue of the *Annals of the Missouri Botanical Garden*, Volume 76: 67–111.

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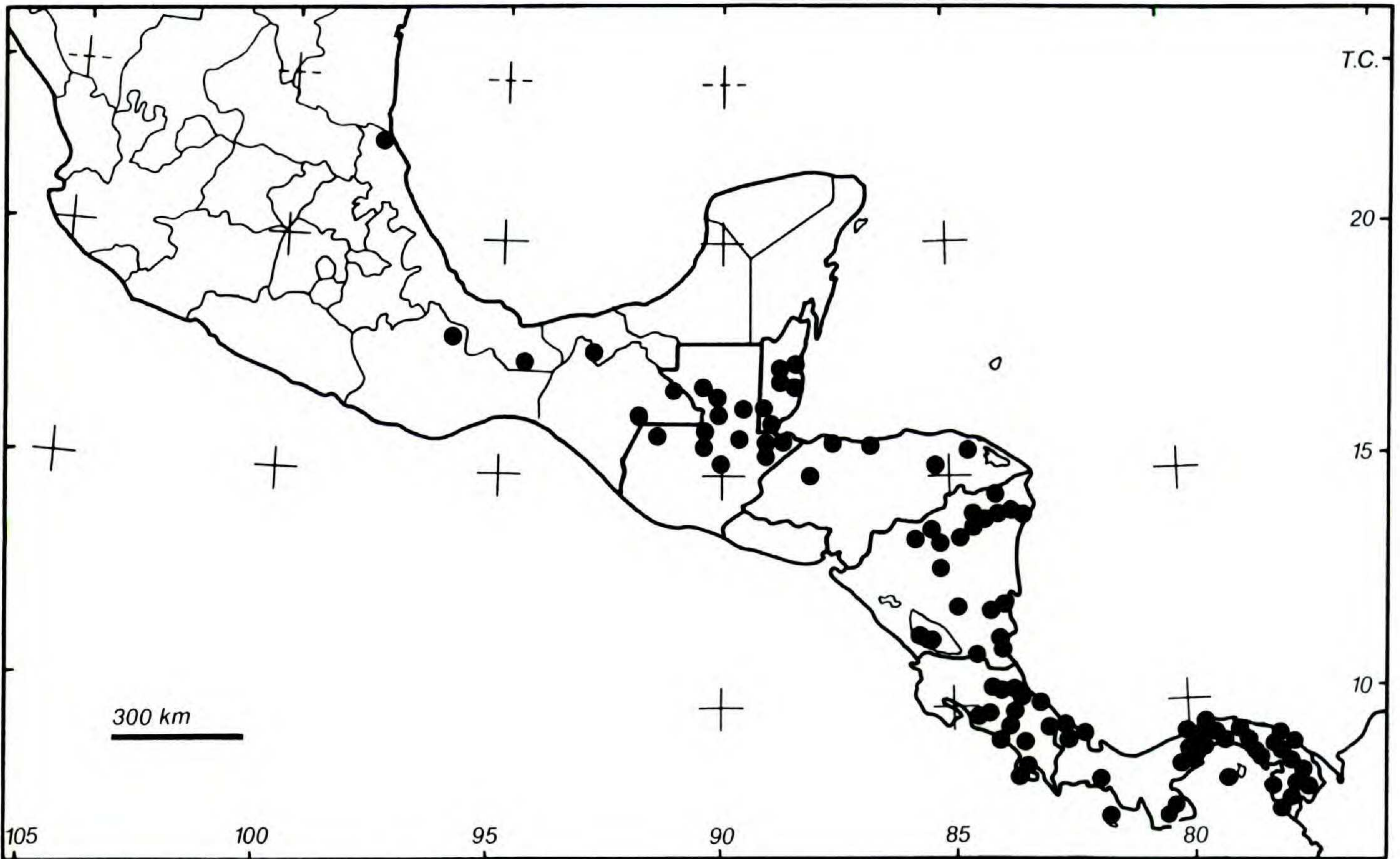


FIGURE 20. Distribution of *Psychotria marginata* in Mesoamerica.

tufts of white hairs; tertiary veins inconspicuous. *Inflorescences* terminal or pseudoaxillary, panicles of glomerules; panicle branched to 2–3 degrees; main axis 1.5–3.5 cm long, the peduncle 1–3 cm long; secondary axes in 1 rank, the first-rank axes

2, 0.4–0.8 cm long; cymes branched to 2 degrees; bracts and bracteoles linear to triangular, often cleft, 1–2 mm long, puberulent within, the margins ciliate. *Flowers* sessile; calyx cup-shaped, the tube 1 mm long, the lobes 5, triangular, 0.5–0.7 ×

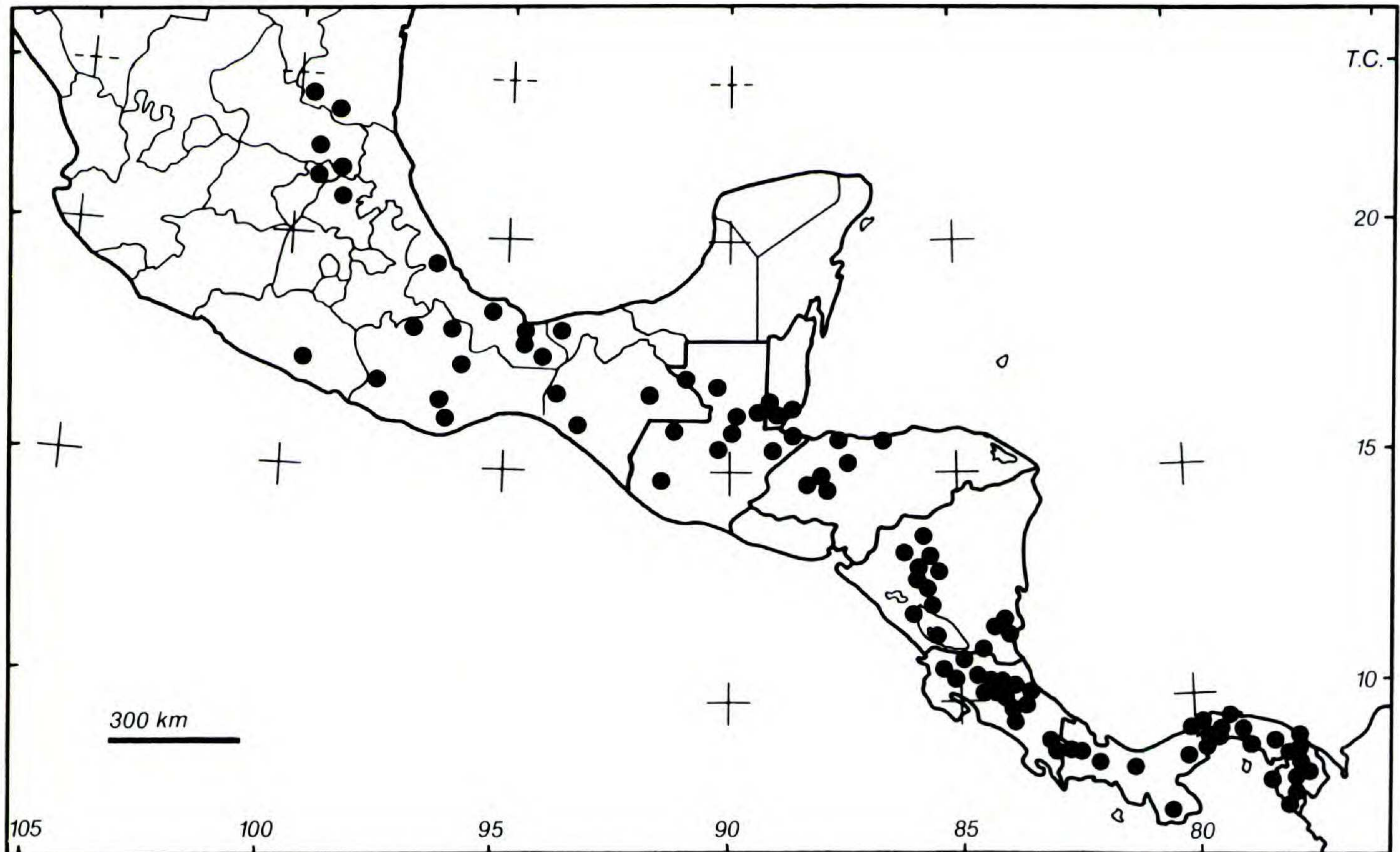


FIGURE 21. Distribution of *Psychotria graciliflora* in Mesoamerica.



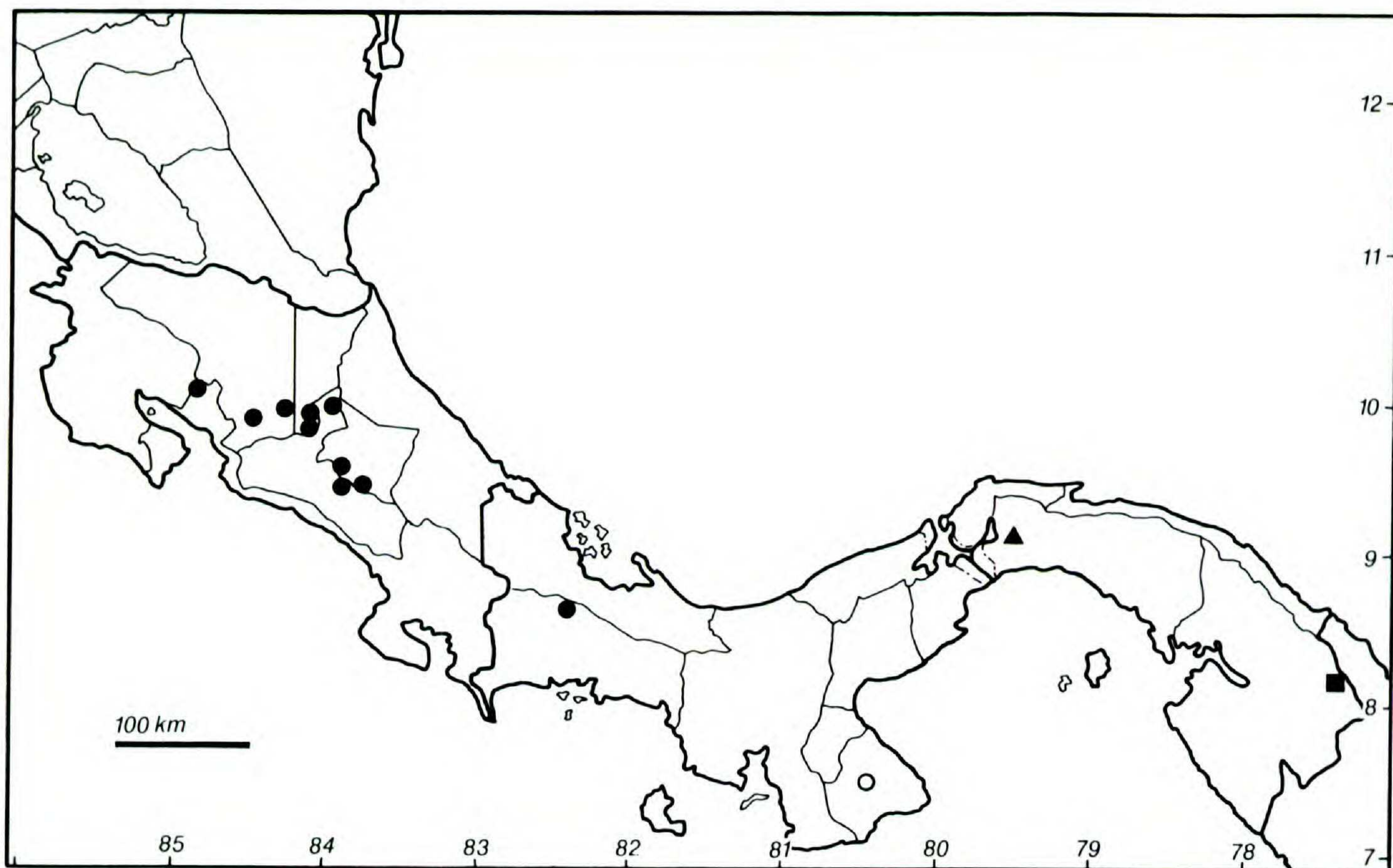


FIGURE 22. Distributions of *Psychotria bakeri* (open circle), *P. liesneri* (triangle), *P. parvifolia* (solid circles), and *P. philacra* (square).

0.6 mm, glabrous; corolla white, the tube cylindrical, 1.5–3 × 1–1.5 mm, white pubescent in throat, the lobes 5, narrow triangular, 1–2 × 1 mm; stamens 5, the filaments not seen in pins, 1.5 mm long in thrums, the anthers 1 mm long; style not seen in pins, 1 mm long in thrums, the branches linear. *Fruit* not seen.

*Distribution* (Fig. 22). Known only from the type collection from Los Santos, Panama at around 800 m elevation in premontane wet forest with tropical-equatorial climate. It was collected in flower on June 8.

*Psychotria bakeri* may be recognized by its small narrow-elliptic (usually 4.5–7 × 1–1.6 cm) leaves with acute apex and small (1.5–3.5 cm long) panicles of glomerules. Only the thrum morph has been seen, but one collection does not suffice to suggest thrum-monomorphy.

**18. *Psychotria graciliflora*** Benth in Oersted, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1852: 35. 1853. *Mapouria graciliflora* (Benth.) Oerst., Amér. Centr. p. 17, t. 14., fig. 6. 1863. *Uragoga graciliflora* (Benth.) Kuntze, Revis. Gen. Pl. 2: 960. 1891. TYPE: Costa Rica. Alajuela: nr. Naranjo, ca. 1,350 m, (fl), Oersted s.n. (holotype, C, n.v., photo, F neg. no. 22832; isotypes, K, US). Figures 10c, 21.

*Psychotria oaxacana* Standley, Contr. U.S. Natl. Herb. 23: 1391. 1926. TYPE: Mexico. Oaxaca: nr. Sto. Domingo, 480 m, 18 June 1895 (fl), E. W. Nelson 2688 (holotype, US).

*Psychotria vallensis* Dwyer, Ann. Missouri Bot. Gard. 67: 438. 1980. TYPE: Panama. Coclé: La Mesa nr. chicken farm, 3 Jan. 1974 (fl, fr), Dwyer 11867 (lectotype designated herein, MO—2163005A; isotypes, F, GH, MO—2 sheets).

*Shrub* 1–3 m tall; young stems glabrous, the bark gray, smooth to shallowly furrowed; stipules ovate, biaristate with often puberulent extensions 3–4(–6) × 1–1.5 mm, glabrous, caducous, leaving a pale ridge with red-brown fringe. *Leaves* sessile to petiolate; petioles 1–7 mm long, glabrous, flat above; blades membranous, elliptic, the apex acuminate or sometimes acute, the base attenuate to narrowly cuneate, (2–)3–8(–11.5) × (0.9–)1.3–3(–3.5) cm, glabrous above and below, drying gray-green to deep red-brown; secondary veins (4)5–8(9) pairs, diverging (67°–)70°–80°(–95°), eucamptodromous to brochidodromous, constantly arcuate, barely elevated below, glabrous, the axils lacking domatia or hairs; tertiary veins inconspicuous to evident, the intersecondaries often evident, orthogonal reticulate. *Inflorescences* terminal or pseudoaxillary, delicate spreading panicles of cymes; panicle branched to 3 degrees; main axis 3–5 cm long, the peduncle 2.5–3.5 cm long; secondary axes in (2–)3 ranks, the first-rank axes 2, 0.8–1.5 cm long, the second-rank axes 2, 0.2–0.6 cm



long, the third-rank axes 2, 0.1–0.2 cm long; cymes branched to 1–2 degrees; bracts triangular to linear, conspicuous, 1–3 mm long, glabrous, sometimes fringed; bracteoles irregular, 0.5–1 mm long, fringed. *Flowers* sessile to pedicellate, the pedicels to 1.5 mm long; calyx cup-shaped, the tube 0.3–0.5 mm long, the lobes 5, barely evident to triangular to linear, to 1 mm long, puberulent outside; corolla white, the tube cylindrical, 2–2.5 × 1 mm, white pubescent in throat, the lobes 5, linear often with blunt protuberance near apex, 1–2 × 0.5–1 mm; stamens 5, the filaments 2–2.5 mm long in pins, 3–3.5 mm long in thrums, the anthers 1 mm long; style 4–5 mm long in pins, 2.5 mm long in thrums, the branches linear. *Fruit* when dry ellipsoid to spherical, 4–5 mm long, 3–4 mm diam., maturing red, drying red-brown to black; persistent calyx a beak to 1 mm long; seed dorsal surface with 4 longitudinal furrows, the ventral surface concave or with 2 broad shallow longitudinal furrows (Fig. 10c).

*Distribution* (Fig. 21). Widespread from Mexico through Panama, missing only in El Salvador. It is noteworthy that such a common and widespread species in Central America is rare at best in South America and apparently absent from the Antilles. *Psychotria graciliflora* has the greatest elevation range of any species of the subgenus, ranging 0–2,500 m, and occurs in tropical moist to lower montane rainforest with equatorial and tropical climate. It has been collected in flower January–August, primarily March–July, and in fruit throughout the year, primarily August–February.

*Selected specimens examined.* MEXICO. CHIAPAS: Mpio. Cintalapa, 16 km NW of Rizo de Oro along a logging rd. to Colonia Figueroa, 1,600 m, 27 Apr. 1972 (fl), *Breedlove 24913* (MEXU); 8 Jan. 1973 (fr), *Breedlove & Smith 31291* (MEXU); Mpio. Ocosingo, adjacent to Laguna Ocotol Grande, 800 m, 6 Feb. 1973 (fr), *Breedlove 33059* (MEXU, MO); SE side of Cerro Tres Picos and ridges nr. summit, 2,100–2,500 m, 28 Mar. 1973 (fl), *Breedlove 34380* (MEXU); Villa Corzo, E base of Cerro Tres Picos nr. Cerro Bola along a logging rd. SW of Colonia Agronomos Mexicanos, 1,500 m, 10 Dec. 1972 (fr), *Breedlove & Thorne 30180* (MEXU). GUERRERO: Mpio. Atoyac, 19 km NE of Atoyac, nr. Santiago La Unión, 770 m, 3 Nov. 1979 (fr), *Koch et al. 79293* (MEXU). HIDALGO: Mpio. Xochicoatlán, Malila, 1,450 m, 16 May 1969 (fl), *Puig 4604* (ENCB, MEXU). OAXACA: Dto. Putla, 10 km al NE de Putla, carr. a Huajuapán, 990 m, 20 June 1982 (fl), *Cedillo & Torres 1481* (ENCB, MEXU); Pluma Hidalgo, N of Pochutla, July 1943 (fr), *Leyva s.n.* (US); Dto. Villa Alta, forest between Los Llanos de Ozumazui and Río Chiquito, 17°35'N, 95°55'W, 500 m, 1 May 1939 (fl), *Schultes & Reko 732* (F); Tuxtpec, Chiltepec, 14 Sep. 1961 (fr), *Sousa 936* (MEXU—2 sheets); Dto. Miahuatlán, 16 km al SE de piedra larga, camino al Progreso, 23 Sep. 1982 (fr), *Torres & Cedillo 1397* (ENCB, MEXU); Dto. Teo-

titlán, “Río Uluapan” 8 km al E de San Bartolomé Ayantla, carr. Huajuapán–Jalapa de Díaz, 880 m, 20 July 1982 (fl, fr), *Torres et al. 845* (ENCB, MEXU). QUERETARO: Mpio. de Tancoyol, La Parada, 1,300 m, 16 Apr. 1969 (fl), *Puig 4500* (ENCB). SAN LUIS POTOSÍ: Las Canoas, hills, 21 Aug. 1891 (fr), *Pringle 5041* (GH); Mpio. de Xilitla, ejido de Xilitilla, 1,000 m, 5 May 1959 (fl), *Rzedowski 10577* (ENCB, MEXU). TABASCO: Mpio. Heroica Cárdenas, km 21 de la carret. Cárdenas–Coatzacoalcos, 19 May 1981 (fl), *Magaña & Curiel 201* (ENCB, MEXU). TAMAULIPAS: nr. Gómez Farías, Rancho del Cielo, 1,260 m, 1 May 1967 (fl), *Gómez-Pompa 2019* (MEXU); Jaumave, 1930 (fr), *Viereck 680* (US). VERACRUZ: Mpio. Catemaco, cerro al NE de Coyame, lado NE de Lago Catemaco, 700 m, 14 Dec. 1971 (fr), *Beaman 5310* (ENCB, F, MEXU); Atoyac, 13 May 1937 (fl), *Matuda 1414* (A, F, K, MEXU, MO, NY); Río Vista, Río Coatzacoalcos, nr. Jesús Carranza, 20 m, 9 Aug. 1971 (fr), *Neuling & Gómez-Pompa 2564* (ENCB—2 sheets, GH, MEXU); Mpio. Hidalgotitlán, Río Soloxuchil, 17°16'N, 94°37'W, 152 m, 2 Apr. 1974 (fl), *M. Vázquez et al. 312* (ENCB, F, MEXU); Mpio. Minatitlán, orilla de Río Uxpanapa, un poco arriba del poblado de Uxpanapa, 120 m, 26 May 1981 (fl), *Wendt et al. 3322* (ENCB, MEXU). GUATEMALA. ALTA VERAPAZ: Sebol, 6 km E of San Luis Road, between Achioté and Sebol, 23 Apr. 1964 (fl), *Contreras 4485* (MO); 10 km N of Cobán, 1,200 m, 4 Jan. 1973 (fr), *L. O. Williams et al. 42086* (F). HUEHUETENANGO: between Ixcán and Río Ixcán, Sierra de los Cuchumatanes, 150–200 m, 23 July 1942 (early fr), *Steyermark 49271* (NY). IZABAL: Puerto Barrios, 28 May 1909 (fl), *Deam 6036* (GH, US); vic. Quiriguá, 75–225 m, 15–31 May 1922 (fl), *Standley 24291* (GH, NY, US). PETÉN: San Diego, Río de la Pasión, 16 Apr. 1935 (fl), *M. Aguilar H. 499* (F, GH, K, MO, NY); La Cumbre, on km 138/139 on San Luis–Cadenas road, in second growth, 19 Sep. 1966 (fr), *Contreras 6145* (MO); low forest between Finca Yalpemech and Chinajá, 50–100 m, 28 Mar. 1942 (fl), *Steyermark 45431* (F); along Río Santa Isabel, between mouth of Río Sebol and El Porvenir, 100 m, 21 Apr. 1942 (fl), *Steyermark 45863* (A, GH). QUEZALTENANGO: Finca Pireneos, below Santa María de Jesús, 1,350–1,380 m, 11 Mar. 1939 (st), *Standley 68196* (A). BELIZE. TOLEDO: Columbia Forest Station, 24 June 1972 (fl), *Dwyer 9903* (DUKE, NY); 16 km from Punta Gorda, rd. to San Antonio, 31 July 1980 (early fr), *Dwyer 15141* (MO—3 sheets); Golden Stream, upper reach, 4 May 1944 (fl), *Gentle 4581* (DUKE—2 sheets, MO). HONDURAS. ATLANTIDA: nr. Tela, Triunfo, 0 m, 28 Dec. 1927 (fr), *Standley 53755* (A, US); foothills back of La Ceiba, 25 June 1938 (fr), *Yuncker et al. 8019* (GH, K, MO, NY, US). COMAYAGUA: Pito Solo, Lake Yojoa, 600 m, 24 Aug. 1932 (fr), *Edwards 469* (A, US). CORTÉS: along Río Lindo, nr. Lake Yojoa, 490 m, 8 Aug. 1948 (early fr), *L. O. Williams & A. Molina R. 14562* (GH). SANTA BARBARA: Montaña Santa Barbara above Sauce nr. Lake Yojoa, 1,000 m, 7 Aug. 1948 (fl), *L. O. Williams & A. Molina R. 14487* (GH). YORO: Subirana, 1,100 m, Oct. 1937 (fr), *Hagen & Hagen 1114* (NY). NICARAGUA. BOACO: Cerro Alegre, San José de los Remates, 12°36'N, 85°44'W, 1,100–1,180 m, 11 Feb. 1983 (fr), *P. P. Moreno 20232* (MO). CHONTALES: Cerro Oluma, ca. 3 km SE de Cuapa, 12°18'N, 85°20'W, 700–740 m, 3 Jan. 1984 (fr), *Grijalva et al. 3376* (MO). GRANADA: Volcán Mombacho, lado N, Plan de las Flores, 1,100 m, 5 June 1975 (fl), *Atwood 306* (MO). JINOTEGA: Volcán de Yalí, 1,500 m, 31 May 1975 (fl), *Atwood 275* (MO); “Filas el Portal” NE del Cerro Kilambé, 13°37'N,



85°40'W, 600–900 m, 26 Mar. 1981 (bud), *P. P. Moreno & Sandino 7599* (MO); Macizos de Peñas Blancas, above Río El Gusaneras, 13°15'N, 85°41'W, 1,200–1,400 m, 13–18 Jan. 1979 (fr), *W. D. Stevens 11638* (MO). MATAGALPA: al NW del Cerro Musún, 800–1,200 m, 14 May 1980 (fl), *Araquistain & P. P. Moreno 2490* (MO); La Galia, N of Sta. María de Ostuma, 1,600 m, 12 Mar. 1967 (fr), *A. Molina R. 20580* (F, NY, US); ridge along rd. between La Danta and La Luna, 12°40'N, 85°43'W, 960–1,000 m, 30 July 1978 (fl), *W. D. Stevens 9597* (MO). RÍO SAN JUAN: nr. Caño Chontaleño, 20 km NE of El Castillo, 200 m, 18–21 Apr. 1978 (fl), *Neill & Vincelli 3483* (MO). RIVAS: Isla de Ometepe, N slope of Volcán Maderas on trail from Balgue to Laguna Maderas, 11°27'N, 85°32'W, 23 Jan. 1981 (fr), *W. Hahn 482* (MO). ZELAYA: rd. between Nueva Guinea and Verdún, 11°39'N, 84°26'W, 240 m, 17 Aug. 1983 (early fr), *J. Miller & Sandino 1104* (MO); Río Punta Gorda, Atlanta, desembocadura del Caño el Guineo, 11°33'N, 84°02'W, 10 m, 11 Nov. 1981 (fr), *P. P. Moreno & Sandino 12858* (MO); Caño Costa Riquita, S of rd. between Colonia Nueva León and Colonia Naciones Unidas, 11°43'N, 84°18'W, 150–180 m, 6–7 Nov. 1977 (early fr), *W. D. Stevens 4953* (MO). COSTA RICA. ALAJUELA: rd. from Canas to Upala, 13.8 km N of Bijagua, 100–150 m, 26 June 1976 (early fr), *Croat 36449* (CR, MO); vic. San Rafael de Guatuso, on Río Frío, 10°43'N, 84°48'W, 80–100 m, 4 Aug. 1949 (fl, early fr), *Holm & Iltis 861* (NY); 12 km NNW of San Ramón on rd. to San Lorenzo, 10°10'N, 84°29'W, 1,100 m, 25 Apr. 1983 (fl), *Liesner & Judziewicz 14914* (CR, MO); 13 km W of Fortuna, rd. to Arenal Dam, 10°29'N, 84°43'W, 500–550 m, 29 Apr. 1983 (fl), *Liesner et al. 15230* (CR, MO); San Carlos, Villa Quesada, 850 m, 12 Mar. 1940 (fl), *A. Smith 2612* (F, GH, MO); Alfaro Ruiz, San Luis, 1,500 m, 20 Apr. 1940 (fl), *A. Smith 2647* (F, NY); vic. Fraijanes, 1,500–1,700 m, 12–13 Feb. 1926 (fr), *Standley & Torres 47600* (US). CARTAGO: along Camino Raiz de Hule, SE of Platanillo (Tsipiri), 1,200–1,400 m, 1 July 1976 (fl), *Croat 36785* (CR, MO); 10 km S of Cartago, 1 km S of Palo Verde, 9°46'N, 83°57'W, 1,450 m, 21 Apr. 1983 (fl), *Liesner & Judziewicz 14537* (CR, MO); N of Muñeco, Río Sombrero, ca. 1,400 m, 25 June 1972 (fl), *Primack et al. 196* (DUKE); Cerro de La Carpintera, 1,500–1,850 m, Feb. 1924 (fr), *Standley 35521* (US). GUANACASTE: Parque Nacional Rincón de la Vieja, SE slopes of Volcán Sta. María, 10°47'N, 85°18'W, 900–1,200 m, 27–28 Jan. 1983 (fl, early fr), *Davidse et al. 23455* (CR, MO); 3 km N of Río Naranjo, W of Tenorio Volcano, 550 m, 3 June 1972 (fl), *Lent 2589* (DUKE, MO). HEREDIA: Finca La Selva, OTS field station, Río Puerto Viejo, 100 m, 5 Feb. 1981 (fr), *Folsom 8756* (DUKE); 1 May 1981 (fl), *Folsom 9957* (DUKE); Vara Blanca de Sarapiquí, 1,500–1,750 m, July–Sep. 1937 (fl), *Skutch 3137* (GH, K, MO, NY, US). LIMÓN: llanuras de Sta. Clara, 300 m, Apr. 1896 (fl), *Donnell-Smith 6602* (GH, K, NY, US—2 sheets); drenajes de los Ríos Parismina y Reventazon, 0 m, 3 Oct. 1951 (fr), *Shank & Molina 4283* (GH, US); vic. Guapiles, 300–500 m, 12–13 Mar. 1924 (fl), *Standley 37279* (US). PUNTARENAS: San Vito de Java, Finca Las Cruces, 1,300 m, 22 May 1971 (fl), *Burch 4587* (MO, NY); Cañas Gordas, Finca Loma Linda, 8°44'N, 82°55'W, 1,140 m, 25 Feb. 1973 (fl), *Busey 627* (F, GH, MO); Río Negro between La Unión and Cortu, 8 Aug. 1974 (early fr), *Croat 26543* (GH, MO); Río Burú, upper slopes of Cerro Burú, 9°01'N, 82°52'W, 1,800 m, 19 Aug. 1983 (early fr), *Davidse*

*et al. 23772* (CR, MO). SAN JOSÉ: La Hondura, 1,300–1,700 m, 16 Mar. 1924 (st), *Standley 37831* (US); La Palma, 1,600 m, 17 Mar. 1924 (fl), *Standley 38200* (US); between Volcán Barba and Irazú ca. 5 mi. NE of San Vicente, ca. 1,450 m, 15 Jan. 1968 (fr), *Wilbur & Stone 9665* (CR, DUKE, MO). PANAMA. CANAL AREA: Coco Solo, 11 Oct. 1972 (fr), *Gentry 6475* (MO); vic. Fort Sherman, 15 Jan. 1924 (fr), *Standley 31070* (US); Gamboa, 14 July 1966 (fl), *Tyson et al. 4562* (DUKE, GH, MO). CHIRIQUÍ: Palo Santo, 3 mi. N of Volcán, 19 Feb. 1971 (fr), *Croat 13594* (F, MO); along Río Colorado, 8°50'N, 82°43'W, 1,200–1,400 m, 17 Mar. 1983 (fl, fr), *Hamilton & Stockwell 3424* (CR, MO); 11 July 1983 (fl, early fr), *Hamilton & Krager 3784* (CR, MO); 7.5 mi. from bridge over Río Chiriquí Viejo on rd. to Río Sereño, 1,350 m, 7 Apr. 1979 (fl), *Hammel et al. 6863* (MO); Finca Ojo de Agua, 8°51'N, 82°46'W, 1,300 m, 14 Oct. 1981 (early fr), *Knapp 1580* (DUKE, MO); ridge 7 mi. N of Los Planes de Hornito, IRHE Fortuna Hydroelectric Project, 8°45'N, 82°12'W, 1,000 m, 13 Mar. 1982 (fl, fr), *Knapp et al. 4178* (MO). COCLÉ: Cerro Pilon, 900–1,173 m, 16 Mar. 1973 (fl), *Liesner 767* (GH, MO, NY); Cerro Pilon, 5 km NE of El Valle, 800–1,045 m, 13 June 1975 (early fr), *Mori 6551* (MO, US). COLÓN: along Río Boquerón above manganese mine, 9°20'N, 79°35'W, 100–200 m, 13 Dec. 1981 (fr), *Knapp & Sytsma 2444* (MO); between France Field and Cativa, 9 Jan. 1924 (st), *Standley 30178* (US). DARIÉN: El Real, Apr. 1966 (fr), *Bristan 83* (GH, MO); Río Mortí, 250 m, 18 Sep. 1967 (early fr), *Duke 14184* (MO, NY); SE of Río Chico, ca. 10 km upstream from Nazareht, 8°15'N, 77°35'W, 500 m, 21 Dec. 1980 (fr), *W. Hahn 163* (MO); E slope of Cerro Sapo, 450 m, 2 Feb. 1978 (fr), *Hammel 1256* (MO); trail SE of Manené to Río Coasi, 24 Dec. 1980 (fr), *Hartman 12211* (MO); vic. Campamento Buena Vista, Río Chucunaque above confluence with Río Tuquesa, 4 July 1959 (fl), *Stern et al. 921* (GH, MO, US); 10 km NE of Jaqué, headwaters of Río Pavarando, 420 m, 31 Jan. 1981 (fr), *Sytsma & D'Arcy 3390* (ENCB, MO); 3 mi. N of Santa Fe, 15 July 1966 (fl), *Tyson et al. 4634* (DUKE, MO). LOS SANTOS: ca. 10 km SW of El Cortezo, 450–600 m, 28 Oct. 1979 (early fr), *Hammel 5428* (MO). PANAMÁ: Río La Maestra, 0–25 m, 4 Dec. 1936 (fr), *Allen 25* (A, F, GH, MO); 5 mi. N of Cerro Azul on rd. to Cerro Jefe, 720 m, 13 Nov. 1965 (fr), *Blum et al. 1699* (SCZ); Majé, trail ca. 5 mi. up Río Majé, 200 m, 10 Nov. 1970 (fr), *Foster & Kennedy 2010* (DUKE, F, MO); Las Cumbres, 26 Nov. 1974 (fr), *J. Gómez 7* (MO); Río Ipetí, S of Pan-Am. Hwy., 9°03'N, 78°25'W, ca. 100 m, 17 Sep. 1982 (early fr), *Hamilton & D'Arcy 1335* (MO); Nuevo Arraiján, 1 km de la carret. Panamericana, 22 Sep. 1974 (fr), *J. Rodríguez 2* (MO). SAN BLAS: Río Kwadi, ca. 6 air miles SW of Mulatupu, ca. 100 m, 20 Sep. 1967 (early fr), *Duke 14214* (MO, NY). VERAGUAS: "Cerro Tute" ridge up from former Escuela Agrícola, Santa Fe, 8°35'N, 81°05'W, 800–1,100 m, 15 July 1983 (early fr), *Hamilton & Krager 3949* (MO); Cerro Tute, ca. 10 km NW of Santa Fe, 750–1,000 m, 18 May 1975 (fl), *Mori 6237* (MO—2 sheets).

Types of *P. oaxacana* and *P. vallensis* have morphologies well within the normal range of *P. graciliflora* and are therefore included.

*Psychotria graciliflora* may be recognized by its fairly small (usually 3–8 × 1.3–3 cm) glabrous



leaves drying grayish or red-brown and with few (usually 5–8) secondary veins diverging usually 70°–80°, its small (main axis 3–5 cm long) delicate inflorescences and its small (4–5 × 3–4 mm) ellipsoid to spherical fruits often drying black. Leaves in Honduras and Nicaragua are at the upper end of the spectrum in terms of size and number of secondary veins, whereas Costa Rican specimens generally have the smallest leaves with the fewest secondaries. Calyx lobes are generally barely evident to triangular, but in Darién and eastern Panamá provinces the lobes are linear.

The exerted style in the pin morph is noticeably longer than the exerted stamens in the thrum (4–5 vs. 2.5–3 mm).

**19. *Psychotria jimenezii*** Standley, J. Wash. Acad. Sci. 15: 288. 1925. TYPE: Costa Rica. San José: La Hondura, ca. 1,400 m, 16 Mar. 1924 (fl), *Standley 37892* (holotype, US). Figure 23.

*Psychotria wendlandiana* Oersted ex Standley, J. Wash. Acad. Sci. 18: 9. 1928. TYPE: Costa Rica. San Miguel, 13 May 1857 (fl), *Wendland 781* (holotype, C, n.v., fragment, F, photo, F. neg. no. 22857; isotype, US).

*Treelet* or shrub, 2–5(–7) m tall; young stems ferruginous-pubescent, the bark smooth; stipules lanceolate to ovate, shortly bifid, 6–9 × 3–5 mm, glabrous, often ciliate, caducous, leaving a pale ridge with red-brown fringe. *Leaves* petiolate; petioles 0.3–2(–3.2) cm long, puberulent, terete; blades membranous, elliptic, the apex acuminate, the base attenuate to cuneate to cordate, (7–)8–15 × (2–)2.5–5(–5.5) cm, glabrous above, puberulent on midvein below, drying red-brown, paler below; secondary veins (11–)12–14(–16) pairs, diverging (60°–)75°–100°, brochidromous with collector vein undulating near margin, constantly arcuate, prominulous below, glabrous, the axils lacking domatia or hairs; tertiary veins inconspicuous to evident, orthogonal reticulate, the intersecondaries often evident. *Inflorescences* terminal or pseudoaxillary, panicles of cymes; panicle branched to 4 degrees; main axis 6–7.5 cm long, the peduncle rarely lacking or 2.5–5 cm long; secondary axes in 3(–4) ranks, the first-rank axes (2)4(6), the longest pair 1.5–2.5(–4), the medium pair when present 0.5–1.6 cm long, the shortest pair when present reduced to 0.3 cm long, the second-rank axes 2 or 4, the longer pair 0.6–2.2 cm long, the shorter pair when present 0.2–1 cm long, the third-rank axes 2 or 4, the longer pair 0.4–0.8 cm long, the shorter pair when present 0.2–0.6 cm long; cymes branched to 2 degrees; bracts lanceolate,

4–6 mm long, ciliate; bracteoles triangular, often split, to 1 mm long. *Flowers* subsessile, the pedicels to 0.5 mm long; calyx cup-shaped, the tube 0.5 mm long, the lobes 5, triangular, barely evident to 0.2 mm long, glabrous, often ciliate; corolla cream, the tube cylindrical, 2–2.5 × 1.2 mm, white pubescent in throat, the lobes 5, lanceolate to ovate, 1–1.2 × 0.7 mm; stamens 5, the filaments 2 mm long in pins, 3 mm long in thrums, the anthers 0.7 mm long; style 3.5–4 mm long in pins, 2 mm long in thrums, the branches linear. *Fruit* when dry ellipsoid to spherical, 3.5–5(–6) mm long, 3.5–4.5 mm diam., maturing red, drying red-brown, sometimes sparsely puberulent; persistent calyx a beak 0.3–0.5 mm long; seed dorsal surface with 3(–4) deep longitudinal furrows, the ventral surface with 2 longitudinal furrows.

*Distribution* (Fig. 23). Found in an east–west band across northern Costa Rica from eastern Guanacaste to Cartago and western Limón, at elevations of 200–1,600 m, mostly above 1,000 m, in tropical wet to premontane rainforest with equatorial-mountainous climate. It has been collected in flower February–May and in fruit August–March.

*Selected specimens examined.* COSTA RICA. ALAJUELA: nr. Qda. Guillermina, N side Volcán Arenal, 10°29'N, 84°42'W, 500 m, 21 Apr. 1973 (fl), *Lent et al. 3412* (DUKE, F, NY); Guadalupe de Zarcero, 1,625 m, 30 May 1938 (fl), *A. Smith 699* (F—2 sheets, GH, MO, NY); Villa Quesada, 600 m, 15 May 1939 (fl, fr), *A. Smith 1793* (MO, NY, US); 2 km N of Bijagua, rd. to San Miguel, 2 Feb. 1976 (fr), *J. Utley & K. Utley 2923* (CR, DUKE). GUANACASTE: 30 km E of Pan-American Hwy. on rd. to Upala, 180 m, 25 Aug. 1980 (fr), *Kress et al. 9594* (DUKE); Los Ayotes, Tilarán, 600–700 m, 21 Jan. 1926 (fr), *Standley & Valerio 45411* (F, US). LIMÓN: below La Palma, upper Río La Hondura on trail to Guapiles, 10°03'N, 83°58'W, 1,100–1,200 m, 16 Dec. 1966 (fr), *Burger 3909* (CR—2 sheets, F—2 sheets, NY). PUNTARENAS: Monteverde, 1,500 m, 14 Apr. 1981 (fl), *Haber 447* (MO). SAN JOSÉ: above Río Hondura at Baja La Hondura, 1,150 m, 31 Dec. 1974 (fr), *J. Taylor 17883* (NY, US); San Rafael nr. Heredia, 1,118 m, 13 Feb. 1890 (fl), *Tonduz 1974* (US).

*Psychotria jimenezii* may be recognized by its ferruginous-pubescent aspect, elliptic leaves often with cordate bases, secondary veins usually 12–14 diverging 75°–100° with undulating collector vein, and inflorescences with secondary axes usually in two unequal pairs per rank in usually three ranks.

The exerted pistil in the pin morph is longer than the exerted stamens in the thrum morph (3.5–4 vs. ca. 3.3 mm).

**20. *Psychotria laselvensis*** C. Hamilton, *Phytologia* 64: 228. 1988. TYPE: Costa Rica. He-



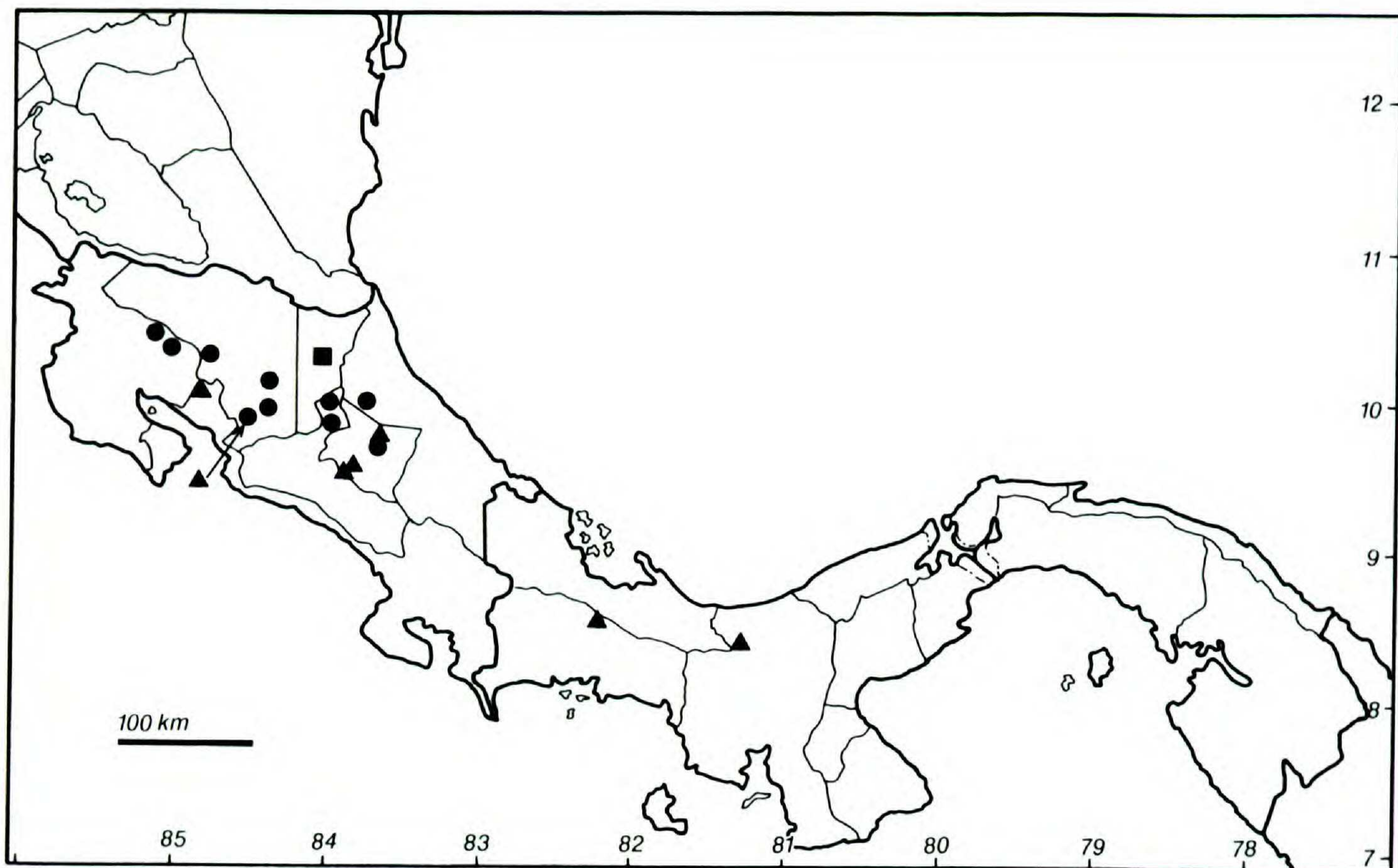


FIGURE 23. Distributions of *Psychotria jimenezii* (circles), *P. laselvensis* (square), and *P. orosiana* (triangles).

Heredia: Finca La Selva, OTS field station, Río Puerto Viejo just E of its junction with Río Sarapiquí, ca. 100 m, 19 May 1980 (fl), *Hammel 8706* (holotype, DUKE; isotype, CR). Figure 23.

*Shrub* 1.5–4 m tall; young stems glabrous, the bark smooth; stipules triangular, 3–4 × 3 mm, glabrous, caducous, leaving a pale ridge with red-brown fringe. *Leaves* subsessile to petiolate; petioles 1–7 mm long, glabrous, grooved above; blades membranous to chartaceous, elliptic, the apex acuminate, the base caudate to subcordate, (5–)7.5–13(–16) × (1.5–)2.5–5 cm, glabrous above and below, drying red-black; secondary veins (8–)10–13 pairs, diverging (65°–)80°–85°, brochidodromous, constantly arcuate, prominulous below, glabrous, the axils often with domatia below; tertiary veins evident, reticulate. *Inflorescences* terminal, spreading panicles of cymes; panicle branched to 4 degrees; main axis 6.5–15 cm long, the peduncle 4–9 cm long; secondary axes in 4–5 ranks, the first-rank axes 2 or 4, the longer pair 1.8–4.2 cm long, the shorter pair when present 0.5–0.7 cm long, the second-rank axes 2 or 4, the longer pair 0.6–1.8 cm long, the shorter pair when present 0.2 cm long, the third-rank axes 2, 0.3–0.9 cm long, the fourth-rank axes 2, 0.1–0.4 cm long, the fifth-rank axes 2, 0.2 cm long; cymes branched to 1 degree; bracts lanceolate to triangular, 2–3 mm

long, glabrous; bracteoles lanceolate, 0.5–1 mm long, glabrous. *Flowers* pedicellate, the pedicels ca. 0.5 mm long; calyx cup-shaped, the tube 0.3 mm long, the lobes 5, triangular, barely evident, minutely ciliate; corolla white, the tube cylindrical, 2.5–3 × 1.2 mm, white pubescent in throat, the lobes 5, lanceolate, 2 × 1 mm; stamens 5, the filaments 2 mm long in pins, 3–3.5 mm long in thrums, the anthers 1–1.2 mm long; style 5–5.5 mm long in pins, 2.5–3 mm long in thrums, the branches linear, recurved. *Fruit* not seen.

*Distribution* (Fig. 23). Known only from the type locality, the Organization for Tropical Studies field station at Finca La Selva, Río Puerto Viejo, Heredia, Costa Rica, at ca. 100 m elevation in tropical wet forest with equatorial climate. *Psychotria laselvensis* has been collected in flower February–May and with immature fruit in July.

*Additional specimens examined.* COSTA RICA. HEREDIA: Finca La Selva, OTS field station, Río Puerto Viejo, 100 m, 1 May 1981 (fl), *Folsom 9958* (CR, DUKE); 4 May 1981 (fl), *Folsom 10004* (DUKE); 18 Feb. 1980 (fl), *Hammel 7778* (DUKE); 1 July 1981 (early fr), *Hammel 10938* (DUKE); 27 Mar. 1982 (fl), *Hammel 11491* (DUKE).

*Psychotria laselvensis* may be recognized by its resemblance to *P. graciliflora* and *P. orosiana* and its generally larger inflorescences and leaves. It differs from *P. orosiana* in having leaf blades



to 13(-16) cm (vs. 10.5 cm) long, more secondary veins (usually 10-13 vs. 7-9), inflorescence secondary axes commonly 4 (vs. 2) in the first rank, and usually shorter corolla tubes (2.5-3 vs. 2.5-5 mm). These three closely related species—*P. graciliflora*, *P. orosiana*, and *P. laselvensis*—form a continuum with regard to many quantitative characters, but their recognition as species is straightforward.

The exerted pistil in the pin morph is conspicuously longer than the exerted stamens in the thrum (5-5.5 vs. 3.5-4 mm).

**21. *Psychotria liesneri*** Dwyer, Ann. Missouri Bot. Gard. 67: 387. 1980. TYPE: PANAMA. PANAMÁ: NE of town of Cerro Azul, 20 km by road from Interamerican Hwy., 10 Dec. 1974 (fr), *Mori & Kallunki 3658* (holotype, MO). Figure 22.

*Shrub* 2-3 m tall; young stems minutely puberulent, the bark pale, irregularly fissured longitudinally; stipules sheathing, triangular-ovate, 2-2.5 × 1.5 mm, puberulent, red-brown ciliate, caducous, leaving a pale ridge with red-brown fringe. *Leaves* petiolate; petioles 2-4 mm long, minutely puberulent, flat and furrowed above; blades membranous to subcoriaceous, elliptic, the apex long-acuminate, the base attenuate, the margin inrolled, (4-)4.5-6(-6.7) × (1-)1.5-2.2 cm, glabrous above, puberulent on midvein below, drying dark green-brown to red-brown; secondary veins 8-10 pairs, diverging 70°-80°, brochidodromous, straight then arcuate near margin, prominulous below, glabrous, the axils usually with often minutely ciliate domatia; tertiary veins inconspicuous, orthogonal reticulate. *Inflorescences* terminal, panicles of cymes; panicle branched to 2-3 degrees; main axis 1.5-3 cm long, the peduncle 1-1.5 cm long; secondary axes in (1-)2(-3) ranks, the first-rank axes 2, 0.3-1 cm long, the second-rank axes 2, 0.2-0.5 cm long, the third-rank axes 2, 0.2 cm long; bracts triangular, ca. 0.7 mm long, puberulent, ciliate; bracteoles triangular, to 0.5 mm long, puberulent, ciliate. *Flowers* sessile to subpedicellate, the pedicels to 0.5 mm long; calyx cup-shaped, the tube 0.3 mm long, the lobes 5, triangular, 0.3 × 0.7 mm, puberulent; corolla green-white, the tube cylindrical, 1.5 × 1 mm, white pubescent in throat, the lobes 5, lanceolate, 0.8 × 0.7 mm; stamens 5, the filaments 1.3-1.5 mm long in pins, not seen in thrums, the anthers 0.5 mm long; style 2.2 mm long in pins, not seen in thrums, the branches lanceolate. *Fruit* spherical when dry, (4-)5 mm long, (4-)5 mm diam., maturing red,

drying black; persistent calyx inconspicuous; seed dorsal surface with 5-6 longitudinal furrows, the ventral surface with 2 longitudinal furrows.

*Distribution* (Fig. 22). Known only from the type region, Cerro Jefe, Cerro Azul, and Goofy Lake (Lago Cerro Azul), eastern Panamá province, Panama, at 600-700 m elevation in premontane wet forest with equatorial-mountainous to tropical-equatorial climate. It has been collected in bud in November, in flower in February, with immature fruit in September, and in fruit in November-December.

*Additional specimens examined.* PANAMA. PANAMÁ: Cerro Jefe, nr. Río Indio, 630-660 m, 17 Feb. 1968 (fl), *Duke 15237* (MO—2 sheets); 8 mi. S of Goofy Lake toward Cerro Jefe, 26 Nov. 1966 (bud), *Dwyer 7083* (GH, MO); 26 Nov. 1966 (fr), *Dwyer 7098* (GH, MO, US); Cerro Jefe, ca. 1 mi. upstream from Frizzel's Finca Indio, 9 Sep. 1970 (early fr), *Foster & Kennedy 1851* (DUKE, F, MO, PMA); Cerro Azul, Feb. 1968 (fl), *Gómez-Pompa et al. 3436* (MEXU).

*Psychotria liesneri* may be recognized by its small elliptic (usually 4.5-6 × 1.5-2.2 cm) often subcoriaceous leaves with inrolled margins, brochidodromous secondary venation, and small (1.5-3 cm long) inflorescences with secondary veins usually in 2 ranks.

In both flowering collections, the negligible separation between style and stamens suggests that the species is long-homostylous instead of distylous.

**22. *Psychotria marginata*** Swartz, Prodr., 43. 1788. *Uragoga marginata* (Sw.) Kuntze, Revis. Gen. Pl. 2: 961. 1891. *Myrstiphyllum marginatum* (Sw.) Hitchc., Annual Rep. Missouri Bot. Gard. 4: 95. 1893. TYPE: Jamaicae australis: (fl), *Swartz s.n.* (holotype, S, n.v., photo, A; isotype, B—Willdenow 4068). Cf. also Swartz, Fl. Ind. Occid. 400. 1797. Figures 4b, 7h, 8, 20.

*Psychotria nicaraguensis* Benth in Oersted, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1852: 34. 1853. *Uragoga nicaraguensis* (Benth.) Kuntze, Revis. Gen. Pl. 2: 957. 1891. TYPE: Nicaragua. San Juan, (fr), *Oersted 11634* (holotype, C, n.v., photos, GH, NY, US; isotype, K).

*Shrub* 1-3(-4) m tall; young stems glabrous, the bark smooth; stipules sheathing, lanceolate, 9-13 × 2.5-4 mm, glabrous, caducous, leaving a pale ridge with red-brown fringe. *Leaves* petiolate; petioles 0.5-2(-2.5) cm long, glabrous, flat or grooved above; blades membranous, oblanceolate, the apex long-acuminate, the base attenuate, (8-)12-18(-20) × (3-)4-6.5(-7.5) cm, glabrous



above and below, the margin often ciliate, drying red-gray to sometimes dull red-brown; secondary veins (9–)12–14(–16) pairs, diverging (55°–)65°–75°, eucamptodromous, constantly arcuate, elevated below, glabrous, the axils usually with domatia along midvein below (Fig. 4b); tertiary veins evident to inconspicuous, orthogonal reticulate to percurrent. *Inflorescences* terminal or pseudoaxillary, diffuse panicles of cymes (Fig. 7h); panicle branched to 5 degrees; main axis (7–)10–15 cm long, the peduncle 4–7 cm long; secondary axes in (4–)5–6 ranks, the first-rank axes 2(4), the longer pair 2–8 cm long, the shorter pair when present 0.5 cm long, the second-rank axes 2, (0.5–)1.5–5.5 cm long, the third-rank axes 2, (0.4–)0.7–2.5 cm long, the fourth-rank axes 2, (0.2–)0.4–1 cm long, the fifth-rank axes 2, 0.2–0.7 cm long, the sixth-rank axes 2, 0.3 cm long; cymes branched to 1–2 degrees; bracts triangular, 1.5 mm long, glabrous; bracteoles lanceolate, 0.3 mm long, glabrous. *Flowers* pedicellate, the pedicels 1–2.5 mm long; calyx cup-shaped, the tube 0.3–0.5 mm long, the lobes 5, not evident to triangular, to 0.2 mm long, often puberulent without; corolla pale yellow, the tube cylindrical, 2–2.5 × 1–1.2 mm, short white pubescent in throat, the lobes 5, lanceolate, 1–1.5 × 0.7 mm, stamens 5, the filaments 1.5–1.8 mm long in pins, 3 mm long in thrums, the anthers 0.8–1 mm long; style 4–4.5 mm long in pins, 2–2.5 mm long in thrums, the branches linear, recurved (Fig. 8). *Fruit* when dry spherical to slightly ellipsoid, 3.5–4 mm long, 3.5–4 mm diam., maturing red, drying black; persistent calyx inconspicuous or sometimes a beak to 0.7 mm long; seed dorsal surface with 4–5 deep longitudinal furrows, the ventral surface with 2 deep longitudinal furrows.

*Distribution* (Fig. 20). Widespread from Mexico through Panama, at elevations of 0–1,000 m, usually below 500 m, in tropical moist to premontane rainforest with equatorial to tropical climate. *Psychotria marginata* occurs also in Cuba, Jamaica, Colombia, Venezuela, Ecuador, and Peru. It has been collected in flower throughout the year, primarily September–April, and in fruit throughout the year.

*Selected specimens examined.* MEXICO. CHIAPAS: Mpio. Las Margaritas, low ridges at confluence of Río Ixcán with Río Lacantum (Río Jataté), 300 m, 14 Mar. 1973 (fr), *Breedlove & McClintock 34065* (ENCB); Centro Arqueológico Bonampak, Mpio. Ocosingo, 350 m, 23 Nov. 1981 (fr), *Meave et al. B-8* (MO). OAXACA: km 5 carret. Tuxtepec–Pueblo Viejo a 500 m a la derecha, 15 June 1964 (fl), *Chavelas & Pérez 4* (MEXU, SLPM). TABASCO: Teapa, (fl), *Linden s.n.* (F ex P). VERACRUZ:

Mpio. Hidalgotitlán, 6 km E del campamento Hermanos Cedillo, 17°00'N, 94°35'W, 110 m, 13 Mar. 1974 (fl), *B. Dorantes 2537* (MEXU—2 sheets); 4 mi. S of Tampico Alto, MEX 180, 18 July 1971 (early fr), *Dwyer et al. 97* (MO). GUATEMALA. ALTA VERAPAZ: Chahal, 200 m from airfield on village rd., in corozal, 2 Oct. 1968 (fl), *Contreras 7793* (F); vic. Laguna Sapalá (Chajvovuch), 2 km SW of Sibicté, 280 m, 11 Mar. 1942 (fl, fr), *Steyermark 44914* (A, F); Cubilgüitz, 350 m, Mar. 1904 (fl), *Tuerckheim 8533* (F, GH, K, US—2 sheets). BAJA VERAPAZ: Unión Barrios, E of km 154, 7 June 1975 (fr), *Lundell & Contreras 19383* (LL). HUEHUETENANGO: between Ixcán and Río Ixcán, Sierra de los Cuchumatanes, 150–200 m, 23 July 1942 (fr), *Steyermark 49228* (F, GH). IZABAL: Puerto Méndez, on Toquela Rd., 8 Sep. 1980 (fr), *Contreras 10227* (MO); vic. Quirguá, 75–225 m, 15–31 May 1922 (fl, fr), *Standley 24534* (F, GH, MO, NY, US); nr. Puerto Barrios, 0 m, 25 Apr.–6 May 1939 (fl), *Standley 72549* (F, NY). PETÉN: San Diego, Río de la Pasión, 11 Apr. 1935 (fl), *M. Aguilar H. 509* (F, GH, K, MO, NY—2 sheets); La Cumbre, km 135 of Cadenas Road, bordering Chacte River, 2 Oct. 1966 (fr), *Contreras 6312* (DUKE, F); San Luis, km 51–52 of rd., 10 July 1959 (fr), *Lundell 16270* (DUKE); forest between Finca Yalpemech along Río San Diego and San Diego on Río Cancuen, 50–150 m, 25 Mar. 1942 (fr), *Steyermark 45376* (F, NY). BELIZE. BELIZE: Burrel Boom, vic. 2nd Ferry, 2 Aug. 1979 (fr), *Dwyer 14943* (MO). CAYO: Cocquericot, 16 Mar. 1931 (fl), *Bartlett 12043* (F, K, NY), Humming Bird Hwy., 35 mi. section, high ridge, 18 Oct. 1955 (fr), *Gentle 8908* (F, GH, US). STANN CREEK: S of Lynam Agricultural College, nr. Stann Creek, 23 Mar. 1967 (fl), *Dwyer et al. 558* (MO—2 sheets); Stann Creek Railway, back of quarry, 1 Feb. 1939 (fl), *Gentle 2685* (A, F, K—2 sheets, NY, US); Middlesex, 60 m, 15 July 1929 (early fr), *Schipp 245* (A, F, K, MO, NY, US); 2 June 1939 (fr), *Gentle 2818* (A, F, K, NY, US); along North Branch SE of Humming Bird Gap, 75 m, 18 Nov. 1976 (fl), *Proctor 36591* (MO). TOLEDO: vic. San José Mayan Indian village, 10 km N of Columbia Forest Station, 13 June 1973 (fr), *Croat 24386* (DUKE, F, MO—2 sheets); Columbia Forest Station entrance, 11 June 1973 (fr), *Dwyer 11095* (MO—4 sheets); Temash River, high ridge, 28 Feb. 1945 (fl), *Gentle 5241* (DUKE, F, NY). HONDURAS. ATLANTIDA: Lancetilla Valley, 16 km SE of Tela, forest preserve, 10–150 m, 3 Aug. 1977 (fr), *Croat 42608* (MO, US); Montaña Lancetilla, 100 m, 17 Mar. 1962 (fl), *A. Molina R. 10309* (F); mountain Nombre de Dios between Saladito and San Francisco, 200 m, 26 Apr. 1967 (early fr), *A. Molina R. 20864* (F); vic. La Ceiba, slopes of Mt. Cangrejal, 16 July 1938 (fr), *Yuncker et al. 8457* (F, GH, K, MO, NY, US). CORTÉS: nr. Agua Azul, Lake Yojoa, 650 m, 14 Apr. 1951 (fl, fr), *L. O. Williams & Molina 17929* (F, GH, US). GRACIAS A DIOS: Qda. Tiro, Río Platano, 15°43'N, 84°50'W, 4 Apr. 1981 (fr), *Saunders 1215* (F, MO). OLANCHO: 30 km NE Culmí, Mata de Maíz, O de Montaña Punta de Piedra, 700 m, 1–4 May 1975 (fr), *C. Nelson & Vargas 2738* (MO). NICARAGUA. CHONTALES: nr. Sto. Domingo, 9 Apr. 1961 (fl, fr), *Bunting & Licht 1145* (DUKE, F, NY, US). JINOTEGA: Comarca Sta. Cruz, el Calvario, al SW del Cerro Kilambe, 13°34'N, 85°40'W, 900–1,000 m, 27 Mar. 1981 (fr), *P. P. Moreno 7713* (MO); Salto Kayaska, Río Bocay, 13°51'N, 85°22'W, 190–340 m, 7 Mar. 1980 (fr), *W. D. Stevens et al. 16530* (MO). MATAGALPA: 4 km al E de Río Blanco, “Wana Wana,” carret. Tuma, 12°55'N, 85°11'W, 280–300 m, 5 May



1984 (fr), *P. P. Moreno 24101* (MO). RÍO SAN JUAN: Río Sabalos, 11°02'N, 84°28'W, 50 m, 19 Feb. 1984 (early fr), *P. P. Moreno 23117* (MO). RIVAS: Isla Ometepe, faldas del lado N del Volcán Maderas, 11°27'N, 85°30'W, 900–1,200 m, 19 Jan. 1983 (early fr), *P. P. Moreno 19687* (MO); Isla Ometepe, Volcán Concepción, 11°33'N, 85°38'W, 600–900 m, 13 Feb. 1984 (fr), *Robleto 218* (MO). ZELAYA: region of Braggman's Bluff (Puerto Cabezas), 1928 (fl), *Englesing 185* (F, K, US); Cerro Waylawás (Peñas Blancas), ca. 5 km al S de Wany, 13°30'N, 84°45'W, 28 Oct. 1982 (fl), *Grijalva & Burgos 1651* (MO); area de la Bahía de Bluefields, Río Escondido, entre Sta. Martha y La Finca, Ginney Point, 0–30 m, 19 Mar. 1949 (fr), *A. Molina R. 1885* (F, GH); Caño Montecristo, desembocadura del Caño El Consuelo, 11°35'N, 83°51'W, 10 m, 7 Feb. 1982 (fr), *P. P. Moreno 15072* (MO); El Guásimo, camino a El Dos, NE de Siuna, 13°48'N, 84°39'W, 360–380 m, 25 Feb. 1983 (early fr), *P. P. Moreno & Robleto 20743* (MO); Monkey Point, 1 km al S sobre la playa, 11°35'N, 83°39'W, 0–5 m, 22 Oct. 1981 (fl), *P. P. Moreno & Sandino 12195* (MO); Colonia Kururia, 14°41'N, 84°04'W, 0–50 m, 3 Mar. 1979 (fr); *Pipoly 4000* (MO); Río Prínzapolka, 2 km S of Waní, 13°42'N, 84°50'W, 0–100 m, 16 Mar. 1979 (fr), *Pipoly 4749* (MO); carret. Matagalpa–Waslala, Río Las Carpas y Río Babasca, 13°15'N, 85°32'W, 540–580 m, 4 Mar. 1982 (fl), *Sandino 2427* (MO); 5 km N de colonia Jacinto Baca Jérez, 11°54'N, 84°24'W, 160 m, 20 Oct. 1984 (fr), *Sandino 4667* (MO); ca. 14.5 km W of Río Wawa ferry on rd. from Puerto Cabezas to Rosita, at Caño Kauhru Tingni, 14°06'N, 83°40'W, 10 m, 2 May 1978 (early fr), *W. D. Stevens 8638* (MO); rd. from Constancia to Laguna Siempreviva, 13°58'N, 84°40'W, 290–360 m, 21 Feb. 1979 (fr), *W. D. Stevens 12409* (MO); vic. Neptune Mining Company, NE Bonanza, 14°01'N, 84°35'W, 200–350 m, 25 Feb. 1979 (fr), *W. D. Stevens 12985* (MO); ca. 6 km upriver from Barra de Punta Gorda, S side, 11°30'N, 83°49'W, 8–10 m, 30 Sep. 1981 (fl), *W. D. Stevens 20736* (MO). COSTA RICA. CARTAGO: Río Turrialba, 500 m, Mar. 1894 (fl, early fr), *Donnell-Smith 4832* (GH, K, US—2 sheets); Atirro, 600 m, Apr. 1896 (fl, fr), *Donnell-Smith 6598* (GH, K, US). HEREDIA: Finca La Selva, OTS field station, Río Puerto Viejo, 100 m, 17 May 1982 (fr), *Hammel 12295* (DUKE); 17 Nov. 1982 (fl), *McDowell 779* (CR, DUKE). LIMÓN: vic. Limón, 0–100 m, 3–7 Sep. 1971 (fr), *Burger & Burger 8488* (CR, F, MO, NY); La Palma, Sixaola, 1 Mar. 1924 (fl, fr), *Dunlap 473* (F, NY); Río Santa Clara, Guapiles, 400 m, 18 Sep. 1964 (fl, fr), *A. Jiménez M. 2366* (CR, F, GH, NY); 4 km NW of El Carmen, 10°13'N, 83°28'W, 10 m, 17 Mar. 1973 (fl, fr), *Lent 3282* (CR, F, NY); Río Reventazón below Cairo, Finca Montecristo, 25 m, 18–19 Feb. 1926 (fr), *Standley & Valerio 48555* (US); Sipurio, Mar. 1894 (fl), *Tonduz 8667* (US). PUNTA-RENAS: 4 mi. W of Rincón de Osa, 8°42'N, 83°31'W, 30 m, 4–7 June 1968 (fr), *Burger & Stolze 5441* (CR, F, MO, NY); Río Barú, nr. Dominical, 9°17'N, 83°52'W, 0–20 m, 20 Feb. 1977 (fr), *Burger et al. 10654* (CR, F, MO); Corcovado National Park, 28 Nov. 1978 (fr), *Janzen 11545* (MO); Río Volcán, 48 km SE of San Isidro El General, 300 m, 1 Mar. 1966 (fr), *A. Molina R. et al. 18192* (CR, F). SAN JOSÉ: Lado de Vargas, Tabarcia, Mora, 920 m, 22 Apr. 1963 (fr), *A. Jiménez M. 661* (CR, F, NY); entre Pedernal y Candelarita, 900 m, 29 May 1966 (fr), *A. Jiménez M. 3965* (F, GH, NY); vic. El General, 850 m, Aug. 1936 (fl), *Skutch 2873* (GH, K, MO, NY, US). PANAMA. BOCAS DEL TORO: above Qda.

Huron on Cerro Bonyik, 150–360 m, 13 Apr. 1968 (fl), *Kirkbride & Duke 591* (F, MO, NY); Almirante, just N of Dos Milla, 20 Aug. 1964 (fl), *McDaniel 5129* (MO); vic. Chiriquí Lagóon, Old Bank Island, 6 Feb. 1941 (fr), *Wedel 2011* (GH, MO, NY, US). CANAL AREA: Barro Colorado Island, 3 May 1969 (fl, fr), *Foster 791* (DUKE, F); 20 Dec. 1931 (fl), *Wetmore & Abbe 3* (A, F, GH, MO); Cerro Galera, just W of Thatcher Bridge, 8°55'N, 79°35'W, 100 m, 15 Feb. 1983 (early fr), *Hamilton & Palmer 2963* (CR, MO); Fort Sherman and nearby, 9°20'N, 80°00'W, 0–100 m, 16 June 1983 (fr), *Hamilton & Stockwell 3695* (MO); Pipeline Rd., 9 km NW of Gamboa, 150 m, 11 Feb. 1974 (early fr), *Nee 9598* (F, GH, MO); hills N of Frijoles, 19 Dec. 1923 (fl), *Standley 27444* (GH, US). CHIRIQUÍ: vic. San Felix, 0–120 m, Sep. 1911 (fl), *Pittier 5742* (NY, US). COCLÉ: vic. El Valle, 600–1,000 m, 8 Dec. 1938 (fl, fr), *Allen 1187* (F, GH, MO); 5 hours walk N of Alto Calvario, between La Junta and Limón, 800–1,000 m, 11 Oct. 1977 (fr), *Folsom 5859* (MO). COLÓN: N of Río Guancho, 100–200 m, 16 Nov. 1975 (fl), *Davidse & D'Arcy 10062* (MO, US); 6 mi. SW of Portobelo, 19 July 1970 (fr), *Luteyn 1416* (DUKE, F, MO); 4 km NW of Salamanca, 13 km NE of Buenos Aires, 340–410 m, 30 Dec. 1973 (fl), *Nee 9091* (F, MO); between France Field and Catival, 9 Jan. 1924 (fl), *Standley 30189* (US). DARIÉN: Río Chico across from Boca de Tesca, 18 July 1962 (early fr), *Duke 5223* (GH, MO); Santa Fe, ca. 15 m, 18–20 Sep. 1967 (fr), *Duke 14271* (MO, NY); E slope of Cerro Pirre, climbing up from Cana, 7°55'N, 77°40'W, 500–1,000 m, 23 Sep. 1982 (fl, fr), *Hamilton & Stockwell 1504* (MO); Cerro Sapo, 750 m, 1 Feb. 1978 (fl, early fr), *Hammel 1195* (MO); 0.5–1.5 mi. E of Manené, 21 Dec. 1980 (fl), *Hartman 12088* (ENCB); ridges on Punta Guayabo Grande, NW of Enseñada El Guayabo, 7°24'N, 78°07'W, 0–100 m, 22 Jan. 1982 (fl), *Knapp & Mallet 2995* (DUKE, MO); Río Tuquesa, 250 m, 8 July 1975 (early fr), *Mori 7032* (US); trail from Paya to Pucro, 12 June 1959 (early fr), *Stern et al. 416* (GH, MO, US). LOS SANTOS: ca. 10 km SW of El Cortezo, “El Pavo” bridge over Río Los Changuales, 450–600 m, 28 Oct. 1978 (early fr), *Hammel 5413* (MO); Loma Prieta, Cerro Grande, 720–840 m, 8 June 1967 (fr), *Lewis et al. 2201* (MO). PANAMÁ: Río La Maestra, 0–25 m, 4 Dec. 1936 (fl), *Allen 11* (MO); Cerro Campana, 750 m, 17 Aug. 1982 (fr), *D'Arcy & Hamilton 14977* (MO); nr. Jeniné, Río Cañita, 24 Sep. 1961 (fr), *Duke 3886* (GH, MO, US); Piriati, S of Pan-Am. Hwy., 9°00'N, 78°30'W, 200–400 m, 8 Aug. 1982 (st), *Hamilton 524* (MO); nr. Lago Cerro Azul, 9°10'N, 79°25'W, 500–600 m, 3 Mar. 1983 (early fr), *Hamilton & Krager 3194* (MO); nr. Arenosa, S shore of Gatun Lake N of Chorrera, 9°05'N, 79°55'W, 0–50 m, 27 Feb. 1983 (fl), *Hamilton & Stockwell 3121* (CR, MO); San José Island, 22 Jan. 1946 (fl), *Johnston 1218* (GH, US); 8 km N on El Llano–Cartí Rd., E of Río Terable, 9°15'N, 78°00'W, 450 m, 19 Aug. 1981 (fr), *Knapp 955* (ENCB, MO); 3.0 mi. E of Cañazas checkpoint, 1–2 mi. S of Pan-Am. Hwy., 8°52'N, 78°15'W, 0–50 m, 27 Feb. 1982 (fl, early fr), *Knapp 3877* (MO); Chimán, 12 Dec. 1967 (fl), *Lewis et al. 3248* (MO); nr. Tapia River, Juan Díaz region, 1–3 June 1923 (early fr), *Maxon & Harvey 6694* (GH, US); nr. Arraiján, 15 m, 22 June 1938 (fl), *Woodson et al. 772* (A, F, MO). SAN BLAS: between Río Diablo and Río Acuati, nr. Nargana, 3 Nov. 1967 (fl), *Duke 14869* (MO, US); headwaters of Río Cuadí, Camp Diablo, 18 Dec. 1967 (fl), *Duke et al. 3644* (MO). VERAGUAS: Coiba



Island, Playa Rosario, 26 Aug. 1970 (fl), *Foster 1614* (DUKE).

*Psychotria marginata* may be recognized by its oblanceolate long-acuminate leaves drying usually red-gray, eucamptodromous secondary venation with axillary domatia, large (usually 10–15 cm long) diffuse panicles of cymes with delicate axes diverging at right angles, and small (3.5–4 mm) spherical fruit drying black. *Psychotria marginata* is remarkably uniform in qualitative and quantitative aspects throughout its broad range.

The exerted pistils in the pin morph are longer than the exerted stamens in the thrum (4–4.5 vs. 3.5 mm).

**23. *Psychotria orosiana*** Standley, J. Wash Acad. Sci. 15: 288. 1925. TYPE: Costa Rica. Cartago: vic. Orosí, 30 Mar. 1924 (fl), *Standley 39803* (holotype, US). Figures 2f, 10d, 23.

*Shrub* or small tree 1.5–4(–5) m tall; young stems glabrous, the bark smooth; stipules lanceolate, 3–5 × 1–2 mm, biaristate, with fringed extensions, caducous, leaving a pale ridge with red-brown fringe (Fig. 2f). *Leaves* sessile to subsessile; petioles to 3 mm long, glabrous; blades membranous, elliptic to oblanceolate, the apex acuminate, the base attenuate to subcordate, (4.5–)5.5–10.5 × 1.7–3.8 cm, glabrous above and below, drying green-black; secondary veins 7–9 pairs, diverging 80°–90°, brochidodromous, constantly arcuate, barely elevated below, glabrous, the axils with domatia below; tertiary veins evident to inconspicuous, orthogonal reticulate. *Inflorescences* terminal or pseudoaxillary, panicles of cymes; panicle branched to 3–4 degrees; main axis 3.5–10 cm long, the peduncle 2.5–7.5 cm long; secondary axes in (2–)3–4(–5) ranks, the first-rank axes 2(4), 1–2.5 cm long, the shorter pair when present 0.7 cm long, the second-rank axes 2, 0.3–1.5 cm long, the third-rank axes 2, 0.2–1 cm long, the fourth-rank axes 2, 0.2–0.4 cm long, the fifth-rank axes 2, 0.2 cm long; cymes branched to 1 degree; bracts triangular, to 1.5 mm long, fringed; bracteoles lanceolate, 0.5 mm long, glabrous. *Flowers* sessile to pedicellate, the pedicels 0.5–2.5 mm long; calyx cylindrical, the tube 0.5 mm long, the lobes 5, triangular to barely evident, to 0.3 mm long, the lobes puberulent outside; corolla yellow-white, the tube cylindrical, 2.5–5 × 1–1.5 mm, white pubescent in throat, the lobes 5, lanceolate, 1.5 × 1 mm; stamens 5, the filaments 2.5–3.5 mm long in pins, 3.5 mm long in thrums, the anthers 0.7–1 mm long; style (4–)5.5–6.5 mm long in pins, 2

mm long in thrums, the branches short, linear. *Fruit* when dry ellipsoid, 4.5–5(–6) mm long, 3.5–4(–5) mm diam., maturing red, drying black; persistent calyx a minute beak; seed dorsal surface with 4–5 deep longitudinal furrows, the ventral surface with 2 shallow longitudinal furrows (Fig. 10d).

*Distribution* (Fig. 23). Known from the central cordillera in Costa Rica and western Panama, at 400–1,400 m elevation, usually above 1,000 m, in premontane to low montane wet to rainforest with equatorial-mountainous climate. It has been collected in flower January–June and September and in fruit in March, June, September, and October.

*Selected specimens examined.* COSTA RICA. ALAJUELA: La Palma de San Ramón, 1,275 m, 30 May 1927 (fl), *Brenes 5534* (CR, F, NY). CARTAGO: Qda. Rojas, 1 km W of Muñeco, 1,240 m, 15 Sep. 1969 (fl), *Lent 1785* (CR, MO, NY); 24 km NE of Turrialba on hwy. to Limón, 9°58'N, 83°34'W, 450–525 m, 10 May 1983 (fl), *Liesner et al. 15377* (CR, MO); vic. Orosí, 30 Mar. 1924 (fl), *Standley 39768* (US). PUNTARENAS: hills NE of Quaker settlement of Monte Verde, 8 May 1971 (fl), *J. Utley 148* (DUKE). PANAMA. CHIRIQUÍ: Proyecto Fortuna, propiedad del IRHE, desde la finca Pittí hasta el filo del Cerro Fortuna, 8°45'N, 82°15'W, 1,000–1,200 m, 25 Sep. 1976 (fl, fr), *M. Correa A. et al. 2726* (MO); Fortuna dam site, 1,400–1,500 m, 14 Sep. 1977 (fl), *Folsom et al. 5454* (MO); La Fortuna project, 1,300–1,400 m, 23 Mar. 1978 (fr), *Hammel 2221* (MO); behind Vivero Forestal de Boquete, 12 km N of Los Planes del Hornito, IRHE Fortuna Hydroelectric Project, 8°43'N, 82°14'W, 17 June 1982 (fl, fr), *Knapp & Vodicka 5522* (MO); lower slopes of Cerro Fortuna, IRHE Fortuna Project, 1,150 m, 18 June 1982 (fl), *Knapp & Vodicka 5595* (MO). VERAGUAS: valley of Río Dos Bocas, 11–13 km beyond Agriculture School at Santa Fe, 350–500 m, 25 July 1974 (early fr), *Croat 25731* (GH, MO).

*Psychotria orosiana* may be recognized by its resemblance to *P. graciliflora*—leaves drying blackish, secondary veins diverging ca. 80°, inflorescence axes delicate—and by its larger (3.5–10 vs. 3–5 cm long) inflorescences, longer corolla tube (2.5–5 vs. 2–2.5 mm), and seed dorsal surfaces with deeper longitudinal furrows having acute longitudinal ridges between.

The reproductive parts at both levels are longer in pin morphs than in thrums.

**24. *Psychotria parvifolia*** Bentham in Oersted, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1852: 35. 1853. *Mapouria parvifolia* (Benth.) Oerst., Amér. Centr. p. 17, t. 14, fig. 1. 1863. *Uragoga levyi* Kuntze, Revis. Gen. Pl. 2: 956. 1891. Not *U. parvifolia* (Muell. Arg.) Kuntze (based on *Rud-*



*gea parvifolia* Muell. Arg.). TYPE of *P. parvifolia* Benth.: Costa Rica. Alajuela: nr. Naranjo, ca. 1,350 m, Apr. 1847 (fl), *Oersted 11637* (holotype, C, n.v., photo, F neg. 22842; isotype, K). Figure 22.

*Shrub* 1.5–3 m tall; young stems ferruginous-pubescent, the bark irregularly furrowed; stipules sheathing, lanceolate, (2.5–)4–6 × (1–)1.2–1.7 mm, ferruginous-pubescent, caducous, leaving a pale ridge with red-brown fringe. *Leaves* petiolate; petioles 2–10 mm long, ferruginous-pubescent, flat above; blades membranous, elliptic to slightly obovate, the apex acute, the base cuneate, (1–)1.5–5.2 × (0.6–)0.8–2 cm, glabrous above and below, the midvein often ferruginous-puberulent, drying dark green-brown to red-brown, paler below; secondary veins 3–5 pairs, diverging 45°–50°, brochidodromous, constantly arcuate, inconspicuous to not evident below, glabrous, the axils lacking domatia or hairs; tertiary veins not evident. *Inflorescences* terminal or pseudoaxillary, panicles of cymes or glomerules; panicle branched to 2–3 degrees; main axis (2–)4–12 mm long, the peduncle lacking; secondary axes in 1–2 ranks, the first-rank axes (1)2, 1–4 mm long, the second-rank axes 2, 1–3 mm long; cymes branched to 1 degree; bracts lanceolate, ca. 2 mm long, glabrous; bracteoles lanceolate, 1 mm long, glabrous. *Flowers* pedicellate, the pedicels 0.5–3 mm long; calyx cup-shaped, the tube 0.3–0.5 mm long, the lobes 4, triangular, to 0.3 mm long, puberulent; corolla white, the tube cylindrical, 2.5–4 × 1–1.5 mm, white pubescent in throat, the lobes 4, lanceolate, 1.5–2 × 0.8 mm; stamens 4, the filaments 2 mm long in pins, 3.5–5 mm long in thrums, the anthers 0.6–0.7 mm long; style 5 mm long in pins, 2–3.5 mm long in thrums, the branches linear. *Fruit* when dry spherical, 4–5 mm long, 4–5 mm diam., maturing red, drying dark red-brown; persistent calyx not evident or a minute beak; seed dorsal surface with 6–8 shallow longitudinal furrows, the ventral surface with 2 deep and sometimes 2–4 shallow longitudinal furrows.

*Distribution* (Fig. 22). Known from the central cordillera in Costa Rica and western Panama, at 1,300–2,000 m elevation in regions of low montane rainforest with equatorial-mountainous climate. *Psychotria parvifolia* has been collected in flower April–September and December and in fruit December–May.

*Selected specimens examined.* COSTA RICA. ALAJUELA: La Palma de San Ramón, Socorro, 22 Aug. 1927 (st), *Brenes 5681* (CR, F, NY); 15 km NW of San Ramón by air, Cerro Azahar, Río San Pedro, 10°09'N, 84°34'W,

1,400–1,500 m, 14 May 1983 (fl), *Liesner et al. 15585* (CR, MO); vic. Fraijanes, 1,500–1,700 m, 12–13 Feb. 1926 (fr), *Standley & Torres 47566* (US); *Standley & Torres 47571* (US). CARTAGO: 15 km S of Tapantí, above Río Grande de Orosí, 9°42'N, 83°47'W, 1,500 m, 12–17 Dec. 1969 (fl), *Burger & Liesner 6847* (CR, F, MO, NY); La Congreja, carret. Panamericana al S de Cartago, km 47, 1,950 m, 28 July 1965 (fl), *A. Jiménez M. 3365* (CR, F). HEREDIA: above San José de la Montaña, on W slope of Volcán Barba, 1,950 m, 15 May 1966 (fr), *Fosberg & Hatheway 47806* (K, MO, NY); Río San Rafael, NW slopes of Barba Volcano, 1,780 m, 17 Sep. 1967 (fl), *Lent 1307* (F); Yerba Buena, NE of San Isidro, 2,000 m, 22–28 Feb. 1926 (early fr), *Standley & Valerio 49194* (US); Cerro de Zurquí, NE of San Isidro, 2,000–2,400 m, 3 Mar. 1926 (early fr), *Standley & Valerio 50271* (US); *Standley & Valerio 50396* (US); Cerro de las Caricias, N of San Isidro, 2,000–2,400 m, 11 Mar. 1926 (fr), *Standley & Valerio 51953* (US); *Standley & Valerio 52044* (US); *Standley & Valerio 52223* (A, US). PUNTARENAS: Monteverde, 1,550 m, 1 Aug. 1979 (fl), *Koptur 171* (MO); Monteverde, 10°20'N, 84°48'W, 1,300 m, 18 Aug. 1976 (fl), *Solomon 5375* (CR, MO). SAN JOSÉ: vic. Sta. María de Dota, 1,500–1,800 m, 14–26 Dec. 1925 (fl, fr), *Standley 42857* (A, US); 26 Dec. 1925–8 Jan. 1926 (fl, fr), *Standley & Valerio 44076* (US); La Hondura de San José, 1,300 m, 15 Aug. 1933 (fl), *M. Valerio 708* (F). PANAMA. CHIRIQUÍ: La Popa above Boquete, 1,550 m, 5 Aug. 1972 (fl), *D'Arcy & D'Arcy 6393* (GH, MO, NY); vic. El Boquete, 1,000–1,300 m, 2–8 Mar. 1911 (fr), *W. Maxon 4958* (F).

*Psychotria parvifolia* may be recognized by its small (usually 1.5–5.2 × 0.8–2 cm) membranous leaves with 3–5 inconspicuous secondary veins, minute (usually 0.4–1.2 cm long) inflorescences, and spherical fruits 4–5 mm in diameter. Collections from Chiriquí, Panama, show more slender inflorescence axes, longer (3 mm) pedicels plus longer corolla tubes and filaments and styles than from Costa Rica.

The exerted pistil in the pin morph is usually longer than the exerted stamens in the thrum (5 vs. 3.8–5.3 mm).

**25. *Psychotria philacra*** Dwyer, Ann. Missouri Bot. Gard. 67: 412. 1980. TYPE: Panama. Darién: Cerro Tacarcuna S slope, ridgetop well below summit, 1,250–1,450 m, 26 Jan. 1975 (fr), *Gentry & Mori 13916* (holotype, MO). Figure 22.

*Shrub* 3 m tall; young stems glabrous or red-brown puberulent, the bark mottled; stipules lanceolate, 4 × 1.2 mm, ferruginous-pubescent, caducous, leaving a pale ridge with red-brown fringe. *Leaves* petiolate; petioles 4–10 mm long, glabrous to sparsely puberulent, flat above; blades membranous, elliptic, the apex acuminate, the base attenuate, 5–7 × 1.7–2.7 cm, glabrous above and



below, drying dull red-brown; secondary veins 6–7 pairs, diverging 60°–70°, eucamptodromous, constantly arcuate, prominulous below, glabrous, the axils lacking domatia or hairs; tertiary veins not evident. *Inflorescences* terminal, seen only with few fruits. *Flowers* not seen. *Fruit* when dry obloid, 4.5–5.5 mm long, 5–6 mm diam., maturing red, drying dark red-brown; persistent calyx inconspicuous or a minute beak; seed dorsal surface with 4 deep irregular and several shallow irregular longitudinal furrows, the ventral surface with 2 deep and several irregular longitudinal furrows.

*Distribution* (Fig. 22). Known only from the type collection from Cerro Tacarcuna, eastern Darién, Panama, at 1,250–1,450 m elevation in low montane rainforest with equatorial-mountainous climate. It was collected in fruit on January 26.

*Psychotria philacra* may be recognized by its small elliptic (5–7 × 1.7–2.7 cm) leaves drying dull red-brown and with 6–7 secondary veins, obloid fruits, and seeds with shallow irregular furrows on both surfaces.

#### GROUP 4. THE *REMOTA* GROUP

The description for the group in Mesoamerica is that of the lone species, *Psychotria remota*. Key recognition characters include leaves drying glossy red-brown and relatively few secondary veins for the large size of the blade. This group is larger in South America, including also *P. anceps* Kunth and *P. cupularis* (Muell. Arg.) Standl.

*Psychotria remota* appears normally distylous, with no floral-part-length asymmetry between the morphs.

**26. *Psychotria remota*** Benth. J. Bot. (Hooker) 3: 225. 1841. *Mapouria remota* (Benth.) Muell. Arg., Flora 59: 459. 1876. Cf. also Martius, Fl. Bras. 6(5): 407. 1881. *Uragoga remota* (Benth.) Kuntze, Revis. Gen. Pl. 2: 962. 1891. TYPE: Guiana: on the Río Negro, (fl), Schomburgk 963 (holotype, K, n.v., photo, NY neg. no. 3421; isotypes, F, W, n.v.). Figures 4a, 7j, 10f, 24.

*Psychotria alboviridula* K. Krause, Notizbl. Koenigl. Bot. Gart. Berlin 6: 208. 1914. TYPE: Brazil: Im Gebiet des Alto Acre, Seringal, San Francisco, Sep. 1911 (fl), Ule 9846 (holotype, B, destroyed, fragment, F, photo, F neg. no. 468; isotype, US).

*Tree* 1.5–6 m tall; young stems glabrous to sparsely minute-puberulent, the bark mottled, slightly ridged longitudinally; stipules sheathing, triangular, acuminate or biacuminate, 4–6 × 2.5–

4 mm, glabrous, sometimes sparsely fringed, caducous, leaving a pale ridge with red-brown fringe. *Leaves* petiolate; petioles 0.7–2.5 cm long, glabrous, flat or grooved above; blades membranous to subcoriaceous, elliptic, the apex long-acuminate, the base cuneate, (8–)11–24 × (3–)3.5–8(–9) cm, glabrous above and below, drying glossy red-brown; secondary veins (7–)8–12 pairs, diverging 60°–70°, eucamptodromous to brochidodromous, constantly arcuate, prominent below, glabrous, the axils usually with prominent domatia below (Fig. 4a); tertiary veins evident, orthogonal reticulate to percurrent, the intersecondaries often conspicuous. *Inflorescences* terminal, elongate panicles of cymes (Fig. 7j); panicle branched to 4 degrees, the axes winged; main axis 7–15 cm long, the peduncle 3–5 cm long; secondary axes in (4–)6–7 ranks, the first-rank axes 2(4), 1–5.5 cm long, the shorter pair when present 1.2 cm long, the second-rank axes 2, (0.3–)0.5–1 cm long, the third-rank axes 2, 0.3–0.9 cm long, the fourth-rank axes 2, 0.2–0.6 cm long, the fifth-rank axes 2, 0.1–0.4 cm long, the sixth-rank axes 2, 0.1–0.3 cm long, the seventh-rank axes 2, 0.1–0.3 cm long; cymes branched to 1(–2) degrees; bracts and bracteoles triangular, 0.5–1.5 mm long, ciliate. *Flowers* pedicellate, the pedicels 0.5–1 mm long; calyx cup-shaped, the tube 0.3–0.5 mm long, the lobes 0 or 5, not evident to triangular, to 0.3 mm long, minute puberulent; corolla yellow-green, the tube cylindrical, 1.5 × 1 mm, white pubescent in throat, the lobes 5, lanceolate, 1 × 0.6 mm; stamens 5, the filaments 1.5 mm long in pins, 2.5 mm long in thrums, the anthers 0.3–0.5 mm long; style 2.5 mm long in pins, 2 mm long in thrums, the branches club-shaped. *Fruit* ellipsoidal when dry, (6–)7–9 mm long, (4–)5–6 mm diam., maturing dark red, drying dark red-brown; persistent calyx not evident or rarely a minute beak; seed dorsal surface with 3 deep longitudinal furrows, the ventral surface with 2 longitudinal furrows (Fig. 10f).

*Distribution* (Fig. 24). Scattered distribution in Caribbean Costa Rica and Panama, at 20–1,000 m elevation in tropical moist to premontane wet forest with equatorial to tropical-equatorial climate. It is more abundant in Colombia, Venezuela, the Guianas, Ecuador, Peru, and Brazil. In Central America, it has been collected in flower in March, April, September, and October and in fruit in March–May and September.

*Selected specimens examined.* COSTA RICA. HEREDIA: Caño Negro, Río Sarapiquí, 23 km N of Puerto Viejo, 20 m, 19 Apr. 1974 (early fr), Hartshorn 1444 (CR, MO). LIMÓN: 7 km SW of Bribri, 100–250 m, 4 May



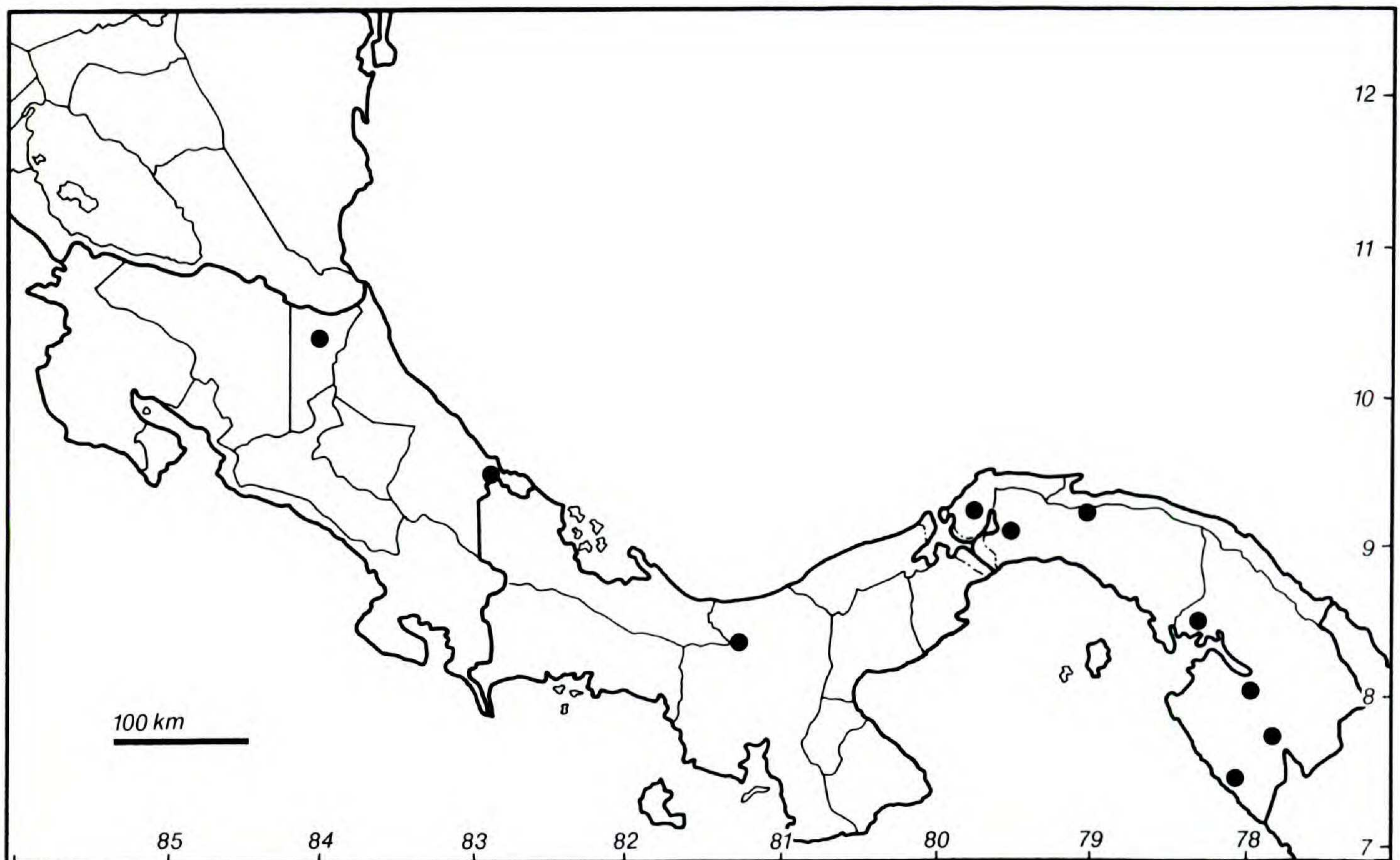


FIGURE 24. Distribution of *Psychotria remota* in Costa Rica and Panama.

1983 (fr), *L. D. Gómez et al.* 20381 (MO). PANAMA. COLÓN: Santa Rita lumber rd., ca. 15 km E of Colón, 5 Oct. 1969 (fl), *Dressler & Lewis* 3732 (MO, US). DARIÉN: trail from Punta Guayabo Grande to Río Jaqué, 50–200 m, 24 Apr. 1980 (fl), *Antonio & Hahn* 4407 (MO); between Río Balsa and Río Aretí at their confluence, 100 m, 13 Sep. 1966 (fl), *Duke* 8745 (MO); Puerta St. Dorotea, 21 July 1962 (bud), *Dwyer* 2218 (MO—2 sheets); 10 km NE of Jaqué, ridge to headwaters of Río Pavarando, 360–500 m, 1 Feb. 1981 (early fr), *Sytsma & D'Arcy* 3443 (MO); Cana-Cuasi Trail, Chipijana, 1,000 m, 9 Mar. 1940 (fr), *Terry & Terry* 1436 (F, GH, MO). PANAMÁ: nr. Lago Cerro Azul (Goofy Lake), 9°10'N, 79°25'W, 500–600 m, 3 Mar. 1983 (fl), *Hamilton & Krager* 3197 (CR, MO); rd. from El Llano to Cartí-Tupile, 300–500 m, 30 Mar. 1973 (fr), *Liesner* 1280 (F, MO, NY); rd. past Cerro Azul, 28 Sep. 1974 (fr), *Mori & Kallunki* 2188 (GH, MO); El Llano-Cartí rd., 16–18.5 km N of Pan-Am. Hwy. at El Llano, 400–450 m, 28 Mar. 1974 (fr), *Nee & Tyson* 10937 (F, MO). VERAGUAS: 0.6 mi. beyond Escuela Agrícola Alto Piedra nr. Santa Fe, 730 m, 4 Apr. 1976 (fr), *Croat & Folsom* 34052 (MO, NY).

The inclusion of *P. alboviridula* within *P. remota* is discussed by Steyermark (1972; Mem. New York Bot. Gard. 23: 477).

*Psychotria remota* may be recognized by its moderately large (usually 11–24 cm long) elliptic leaves drying glossy red-brown, few (usually 8–12) secondary veins generally with prominent domatia in the axils, reduced (except for the first rank) and winged secondary inflorescence axes, and large (usually 7–9 mm long) ellipsoidal fruit.

#### GROUP 5. THE *NERVOSA* GROUP

*Shrub*; young stems glabrous or red-brown to brown tomentose to puberulent; stipules usually sheathing, linear (Fig. 2c) or ovate, the apex sometimes bilobed or biaristate, uniform in color (except *P. fosteri*, with a darker red-brown midrib), glabrous or fringed or red-brown pubescent, caducous. *Leaf* blades obovate or elliptic or oblanceolate, drying red-brown to green-brown (often chalky yellow-green in *P. fruticetorum*), sometimes pale below; secondary veins (4–)5–17 pairs, diverging 35°–65° (except 70°–80° in *P. fosteri*), eucampitodromous or brochidodromous (with collector vein in *P. chagensis* and *P. fosteri*), the axils usually with tufts of hairs (lacking in *P. chagensis*, *P. fosteri*, and usually *P. nervosa*); tertiary veins reticulate or percurrent. *Inflorescences* panicles of cymes (often contracted in *P. nervosa*) or fascicles of flowers (in *P. chagensis* and *P. fosteri*), not pedunculate (except *P. erythrocarpa*, *P. fruticetorum*, and often *P. jinotegensis*); secondary axes usually in 1 pair or less commonly 2 size-differentiated pairs per rank (4 equal axes per rank rarely in *P. nervosa*); bracts conspicuously enlarged in *P. chagensis*, *P. fosteri*, and *P. fruticetorum*. *Corolla* tubes 2–4 mm long (6–7 mm in *P. chagensis*), the lobes without apical extensions. *Fruit* ellipsoid when dry (narrow in *P. nervosa*); persistent calyx a tube to 5 mm long (Fig. 9d)



or a beak or inconspicuous; *seed dorsal surface with 4–5 deep longitudinal furrows* (or 6–8–many irregular furrows in *P. aguilarii* and *P. jinotegensis*), the ventral surface with 2 deep or shallow longitudinal furrows, sometimes incompletely divided in *P. nervosa* or with additional irregular furrows in *P. jinotegensis*.

Of the nine species, three fairly widespread ones do not closely resemble any others: *Psychotria fruticetorum*, with its biaristate stipules, leaves drying chalky yellow-green, pedunculate inflorescences, and bracts as long as 8 mm; *P. erythrocarpa*, with its linear stipules and pedunculate inflorescences often of glomerules; and *P. jinotegensis*, with its often pedunculate inflorescences and many irregular furrows on both seed surfaces. The *P. chagrensis* complex shares a collector vein, an absence of tufts of hairs in the axils of the secondary veins, and inflorescences of fascicles of flowers and with bracts conspicuously enlarged; the complex comprises the widespread *P. chagrensis* and *P. fosteri*, endemic to Coiba Island, Panama (Fig. 26). The *P. nervosa* complex includes that widespread species plus *P. aguilarii* (southern Guatemala), *P. boquetensis* (western Panama), and *P. mirandae* (southern Mexico); none of them deviates morphologically from the predominant character states of the group.

Of the nine species in the group, seven appear distylous. Of those, *Psychotria fruticetorum* has longer exerted parts in the pins than in thrums, and *P. chagrensis* has longer inserted parts in the pins. One species, *P. mirandae*, appears to be thrum-monomorphic. Only *P. fosteri* may not be evaluated for this character due to lack of adequate flowering material.

**27. *Psychotria aguilarii*** Standley & Steyermark, Publ. Field Mus. Nat. Hist., Bot. Ser. 23: 23. 1943. TYPE: Guatemala. Chimaltenango: rd. between Chimaltenango and San Martín Jilotepeque, 1,500–1,700 m, 22 Dec. 1940 (fr), *Standley 80900* (holotype, F). Figure 25.

*Shrub* 1–2(–6) m tall; young stems glabrous, the bark pale with shallow fissures; stipules sheathing, ovate, 7–10 × 2–4 mm, lacking fringe, glabrous, caducous, leaving a pale ridge with irregular fringe. *Leaves* petiolate; petioles 2–4(–7) mm long, glabrous, flat above; blades membranous, narrow elliptic to obovate, the apex acuminate, the base attenuate, the margins crenulate, (8–)11–13 × (2.5–)3–4 cm, glabrous above, sparsely puberulent along midvein below, drying red-brown or some-

times greenish; secondary veins 8–11 pairs, diverging (45°–)50°–60°, eucamptodromous, slightly arcuate, prominent below, glabrous, the axils with minute tufts of hair; tertiary veins evident, reticulate to slightly percurrent. *Inflorescences* terminal or pseudoaxillary, sparse panicles of cymes; panicle branched to 2–3 degrees; main axis 3–4 cm long, the peduncle lacking; secondary axes in 2 ranks, the first-rank axes 2, 2–2.2 cm long, the second-rank axes 2, 0.5–1.2 cm long; cymes branched to 1–2 degrees; bracts and bracteoles minute, linear, ca. 0.2 mm long, glabrous. *Flowers* sessile; calyx cup-shaped, the tube 0.5–1 mm long, the lobes 5, acute triangular, 0.2–0.5 × 0.3 mm, glabrous; corolla greenish white, the tube cylindrical, 3–3.5 × 1 mm, white pubescent in throat, the lobes 5, acute triangular, 1–1.5 × 0.7 mm; stamens 5, the filaments 2 mm long in pins, 3.5 mm long in thrums, the anthers 1 mm long; style 3.5 mm long in pins, 2 mm long in thrums, the branches spatulate. *Fruit* when dry ellipsoid, 5–6 mm long, 3–4 mm diam., maturing dark red, drying dark brown; persistent calyx not evident; seed dorsal surface with many irregular shallow longitudinal furrows, the ventral surface with 2 deep longitudinal furrows.

*Distribution* (Fig. 25). Known only from the Guatemalan states of Chimaltenango, Escuintla, Guatemala, Huehuetenango, and Sacatepéquez, at elevations of 1,000–1,500 m, in tropical-mountainous climate. *Psychotria aguilarii* has been collected in flower in February and May and in fruit in August and December.

*Additional specimens examined.* GUATEMALA. ESCUINTLA: 6 km W of San Vicente Pacaya, 1,250 m, 31 May 1970 (fl), *Harmon 2431* (MO). GUATEMALA: nr. Finca La Aurora, 1,500 m, 1938–1939 (fr), *I. Aguilar 126* (F); 1939 (early fr), *I. Aguilar 215* (F). HUEHUETENANGO: Paso del Boquerón, along Río Trapichillo, below La Libertad, 1,200–1,300 m, 21 Aug. 1942 (fr), *Steyermark 51133* (F). SACATEPÉQUEZ: nr. Barranco Hondo, SE of Alotenango, 1,000–1,260 m, 9 Feb. 1939 (fl), *Standley 65024* (F).

*Psychotria aguilarii* may be recognized first by its striking resemblance to *P. nervosa*. The former differs in being generally glabrous (as is *P. nervosa* sometimes) and in having leaves with crenulate leaf margins, inflorescence secondary axes in 2 (vs. 3–4) ranks, longer corolla tubes (3–3.5 vs. 2–3 mm), fruit less narrowly ellipsoidal (length/width = 1.5 vs. ca. 2.2), and seed dorsal surface with many irregular shallow furrows (vs. 4–5 regular furrows).

**28. *Psychotria boquetensis*** Dwyer, Ann. Missouri Bot. Gard. 67: 349. 1980. TYPE: Pan-



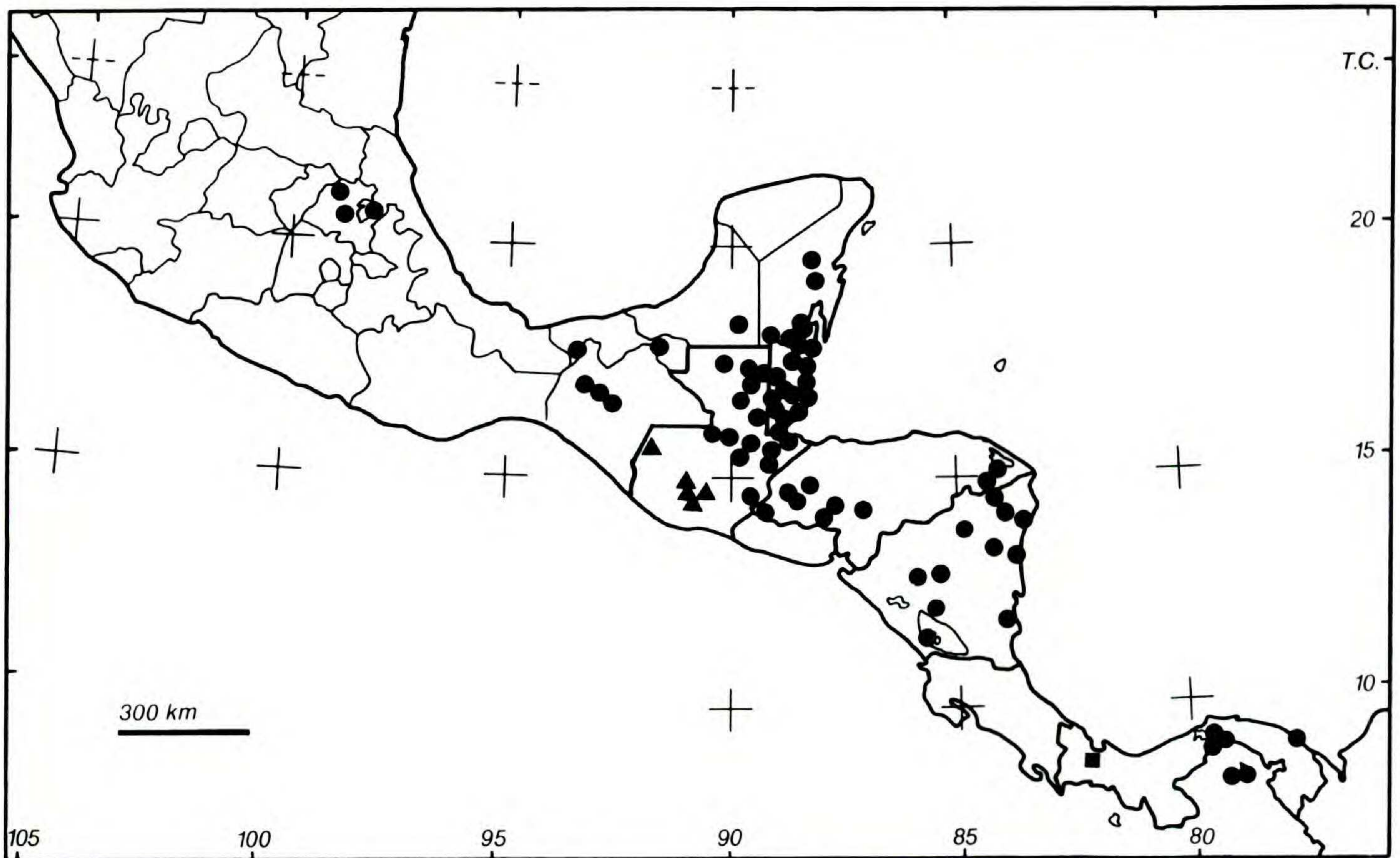


FIGURE 25. Distributions of *Psychotria aguilarii* (triangles), *P. boquetensis* (square), and *P. fruticetorum* (circles) in Mesoamerica.

ama. Chiriquí: Boquete, 1,080 m, 25 May 1938 (fl), Davidson 709 (holotype, MO; isotypes, F, US). Figure 25.

*Shrub* 0.5–2 m tall; young stems brown tomentose, the bark gray, longitudinally grooved; stipules sheathing, ovate, bilobed with the lobes 2–6 mm long, (6–)8–11 × 2.5 mm, lacking fringe, glabrous or sometimes sparsely tomentose, caducous, leaving a pale ridge with red-brown fringe. *Leaves* sessile; petioles 3–6 mm long, brown tomentose, flat or grooved above; blades membranous, elliptic to oblong, the apex long-acuminate, the base attenuate, (6–)9–15 × (1.5–)2–4 cm, glabrous to slightly puberulent along primary and secondary veins above, sparsely tomentose along veins below, the margins ciliate, drying red-brown, paler below; secondary veins (10–)12–15 pairs, diverging 40°–50°, eucamptodromous, slightly arcuate, prominent below, brown tomentose below, the axils with small tufts of hairs below; tertiary veins evident, orthogonal reticulate to slightly percurrent. *Inflorescences* terminal or pseudoaxillary, sparse panicles of cymes; panicle branched to 3 degrees; main axis 1.2–2.0 cm long, the peduncle lacking; secondary axes in (2)3 ranks, the first-rank axes 2, 10–15 mm long, the second-rank axes 2, 4–10 mm long, the third-rank axes 2, 2–3 mm long; cymes branched to (1)2 degrees; bracts appearing to consist of planes of long whitish hairs,

1 mm long, immediately subtending the flowers. *Flowers* sessile to subsessile, the pedicels to 1 mm long; calyx cup-shaped, the tube 0.5–1 mm long, the lobes 5, triangular to linear, (0.5–)1–1.5 × 0.5 mm, glabrous; corolla white, the tube cylindrical, 2–3 × 1 mm, white pubescent in throat, the lobes 5, linear-ovate, 1.5–2 × 0.8 mm; stamens 5, the filaments 2 mm long in pins, 3.5 mm long in thrums, the anthers 0.5–0.7 mm long; style 3.5 mm long in pins, 2 mm long in thrums, the branches club-shaped in pins, linear in thrums, the branches puberulent. *Fruit* not seen.

*Distribution* (Fig. 25). Known only from the type locality near Boquete, Chiriquí, Panama, in premontane wet forest with equatorial-mountainous climate at about 1,200 m. *Psychotria boquetensis* has been collected in flower in May and June.

*Additional specimens examined.* PANAMA. CHIRIQUÍ: Boquete, 1,200 m, 30 June 1938 (fl), M. Davidson 849 (A, F).

*Psychotria boquetensis* may be recognized first by its striking resemblance to *P. nervosa*. *Psychotria boquetensis* differs in having often linear calyx lobes usually 1–1.5 mm (vs. to 0.2 mm) long; in quantitative characters such as leaf and inflorescence size, *P. boquetensis* falls at the lower end of the *P. nervosa* spectrum.



**29. *Psychotria chagrensis*** Standley, J. Wash. Acad. Sci. 15: 105. 1925. TYPE: Panama. Canal Area: Barro Colorado Island, Gatun Lake, 17 Jan. 1924 (fr), *Standley 31373* (holotype, US). Figure 26.

*Shrub* 1–2.5 m tall; young stems glabrous, the bark smooth; stipules sheathing, the apex aristate and 2–4 mm long, the sheath 4–7 × 3 mm, glabrous, caducous, leaving a pale ridge. *Leaves* petiolate; petioles 2–5(–8) mm long, glabrous, flat or grooved above; blades membranous, elliptic to obovate, the apex acuminate, the base attenuate, (3–)4–7.5(–9.5) × (1–)1.5–2.5(–3.5) cm, glabrous above and below, drying red-brown, often dull green below; secondary veins (6–)8–10 pairs, diverging (45°–)55°–65°, brochidodromous with collector vein distinct, straight to slightly arcuate, scarcely elevated below, glabrous, the axils lacking domatia and hairs; tertiary veins usually inconspicuous, the intersecondaries sometimes faint, the percurrent tertiaries rarely evident. *Inflorescences* terminal or pseudoaxillary, fascicles of several flowers, 5–8 mm long, 5–8 mm across; peduncles lacking; bracts elongate, often irregularly divided, 4–5 × 1.5–2 mm, glabrous, the margins often ciliate. *Flowers* sessile; calyx green, the tube cylindrical, 0.5–2 mm long, the lobes 5, linear, 2–2.5 × 0.5 mm, glabrous to puberulent, the margins ciliate; corolla white, the tube cylindrical, 6–7 × 1 mm, white pubescent in throat, the lobes 5, narrow-elliptic, 2–2.5 × 0.7 mm; stamens 5, the filaments 5–6 mm long in pins, 8 mm long in thrums, the anthers linear, 1 mm long; style 7–9 mm long in pins, 2–5 mm long in thrums, the branches linear, sometimes recurved. *Fruit* when dry ellipsoid, 5–7 mm long, 3–3.5 mm diam., maturing red, drying deep red-brown; calyx persistent, the tube 0.5–2 mm long, the lobes 2–2.5 mm long; seed dorsal surface with 4–5 deep longitudinal furrows, the ventral surface with 2 shallow longitudinal furrows.

*Distribution* (Fig. 26). Commonly collected on the Caribbean lowlands and slopes in Nicaragua–Panama, with apparently disjunct populations in Veracruz, Mexico, and Izabal, Guatemala. The range extends southward in Colombia and Peru. *Psychotria chagrensis* is found in Central America often near creek beds at elevations of 0 to 1,300 m in tropical moist to premontane moist and wet forest with equatorial to tropical-equatorial climate. It has been collected in flower in December–September, primarily March–July, and in fruit throughout the year, primarily September–December.

*Selected specimens examined.* MEXICO. VERACRUZ: San Andres Tuxtla, Estación de Biología Tropical Las Tuxtlas, 150 m, 7 Nov. 1968 (fr), *Martínez 1785* (A, ENCB—5 sheets, F, K, MEXU—2 sheets, MO). GUATEMALA. IZABAL: Cerro San Gil, uppermost ridges and summit, 1,200–1,300 m, 26–27 Dec. 1941 (fr), *Steyermark 41949* (F). NICARAGUA. RÍO SAN JUAN: San Juan del Norte, 0 m, 27 Mar. 1971 (fr), *Atwood 5258* (MO); El Castillo Viejo, (fl), *Shimek & Smith 1893* (F). ZELAYA: Comarca del Cabo, swamp nr. Bilwaskarma, 0–100 m, 14 Mar. 1971 (fl), *Atwood 4678* (MO); Comarca del Cabo, matorrales del Río Leicus, region de Tronqueras, 60 m, 19 Aug. 1965 (fr), *A. Molina R. 14925* (F, NY, US); “Kurinwacito,” 13°08'N, 84°55'W, 90 m, 25 Mar. 1984 (fl), *P. P. Moreno 23901* (MO); El Salto, along Río Pis Pis, 14°04'N, 84°38'W, 100 m, 27 Feb. 1979 (fr), *Pipoly 3572* (MO); 1.8 km N of base camp, 3.6 km SE Cerro San Isidro, Río Kama, Río Escondido, 65 m, 14 Mar. 1966 (fl), *Proctor et al. 27134* (F, NY); trail from Cerro Saslaya to San José de Hormiguero, 13°44'N, 84°57'W, 200–400 m, 13 Mar. 1978 (fl), *W. D. Stevens 7043* (MO); Caño Zamora on Río Rama, 11°57'N, 84°16'W, 10 m, 16 May 1978 (fl), *W. D. Stevens 8867* (MO); about 3.9 km SE of El Empalme on road to Limbaika, 13°39'N, 84°24'W, 65 m, 24 Feb. 1979 (fr), *W. D. Stevens 12910* (MO). COSTA RICA. ALAJUELA: E of Río San Rafael, W of La Marina, 10°23'N, 84°23'W, 500 m, 19 May 1968 (fl), *Burger & Stolze 5032* (CR, DUKE, F, MO); San Carlos, Quesada, 850 m, 12 Mar. 1940 (fr), *A. Smith 2587* (A, F, MO). HEREDIA: Finca La Selva, the OTS field station on Río Puerto Viejo, 100 m, 20 Mar. 1982 (fl), *Folsom 9412* (DUKE); 6 Dec. 1982 (fr), *McDowell 1066* (DUKE); Tirimbina, 210 m, 29 May 1971 (fl), *Proctor 32118* (LL). LIMÓN: Río Toro Amarillo, 5.5 km al SO de Guapiles, 350 m, 10 Aug. 1963 (fr), *Jiménez 1059* (CR, F, MO); drenajes de los ríos Parismina y Reventazon, 0 m, 3 Oct. 1959 (fr), *Shank & Molina 4160* (GH, US). PUNTARENAS: Monte Verde, 10 m, 15 May 1925 (fl), *Stork 2364* (F). PANAMA. BOCAS DEL TORO: Changuinola, nr. Luzón, 20 June 1973 (fl), *Kennedy 3259* (MO). CANAL AREA: Pipeline Road, 14 mi. NW of Gamboa gate, 26 Sep. 1970 (fr), *Croat 12357* (DUKE, F, GH, MO, NY); Barro Colorado Island, 31 May 1969 (fl), *Foster 899* (DUKE—2 sheets); 18 Aug. 1934 (fr), *Shattuck 1152* (F, MO); Fort Sherman and nearby, 9°20'N, 80°00'W, 0–100 m, 16 June 1983 (st), *Hamilton & Stockwell 3682* (MO). COCLÉ: hills N of El Valle de Antón, 1,000 m, 14 July 1940 (fl), *Allen 2186* (F, GH); between Caño Blanco del Norte, Caño Sucio, and Chorro del Río Tife, 8°43'N, 80°37'W, 200–400 m, 3 Feb. 1983 (st), *Davidse & Hamilton 23483* (MO); Alto Calvario, 7 km N of El Copé, ca. 900 m, 14 Jan. 1977 (fr), *Folsom 1304* (MO); divide above El Copé, 8°40'N, 80°35'W, ca. 1,200 m, 25 July 1983 (st), *Hamilton & Krager 4167* (MO). COLÓN: 4 mi. W of Portobelo, ca. 0 m, 9 Sep. 1979 (fr), *Antonio 1771* (MO); Santa Rita Ridge lumber road, 3 Oct. 1968 (fr), *M. Correa A. & Dressler 1072* (DUKE, MO); hillside ca. 7 mi. on way to Nombre de Dios E of junction with road to Isla Grande, 4 Apr. 1980 (fl), *D'Arcy 13615* (MO); trail S of Río Guaniche, on ridge to Cerro Pan de Azucar, 200 m, 20 Sep. 1974 (fr), *Mori & Kallunki 2010* (MO). DARIÉN: Camp Summit, between Mortí and Sasardí, ca. 400 m, 14 Feb. 1967 (fr), *Duke 10027* (MO); ridges between Río Jaqué Valley and Pacific Ocean, 7°26'N, 78°05'W, 300–500 m, 24 Jan. 1982 (fl), *Knapp & Mallet 3102* (MO). PANAMÁ: El Llano–Cartí Road, 13.8 km N of Pan-



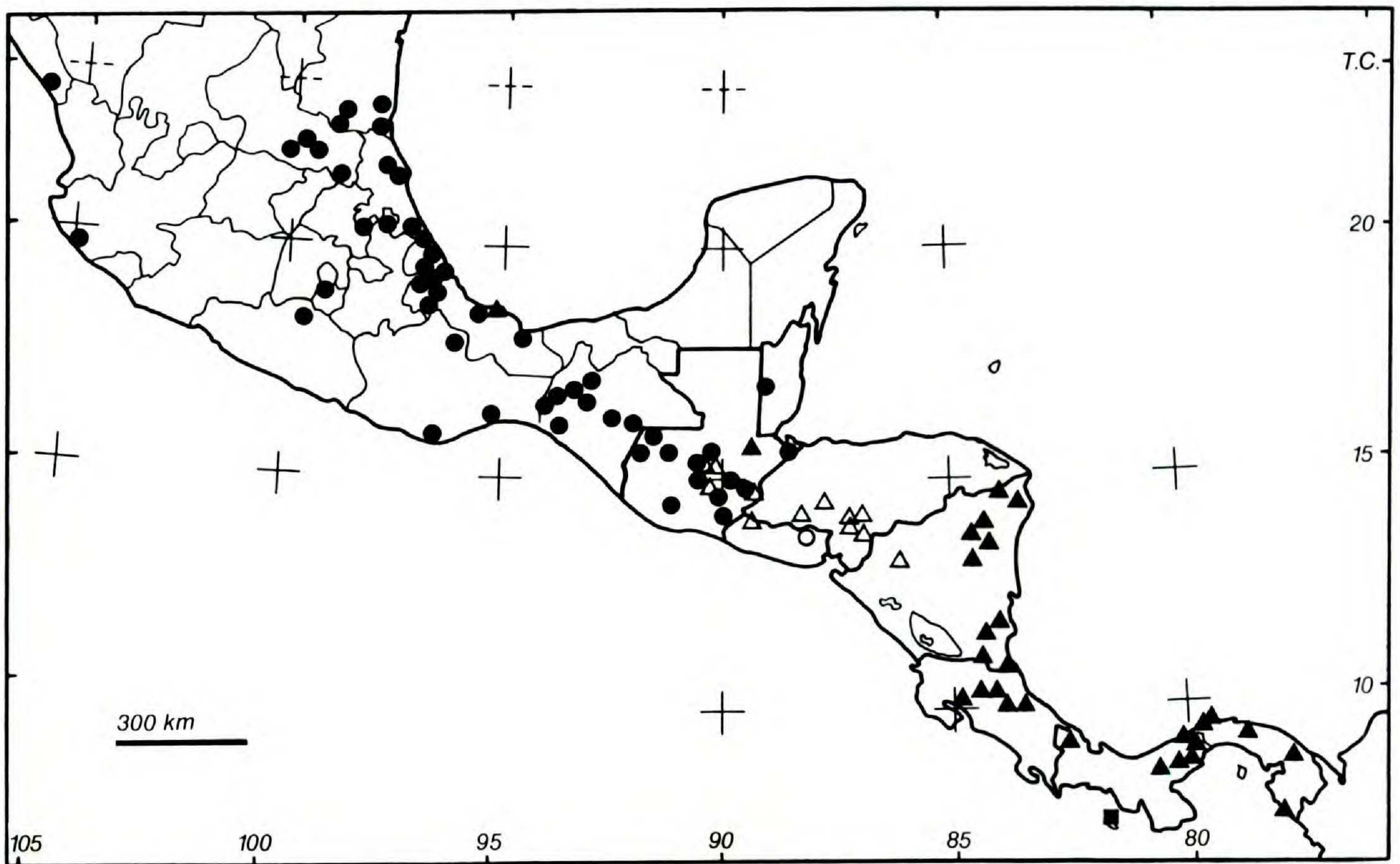


FIGURE 26. Distributions of *Psychotria chagensis* (solid triangles), *P. erythrocarpa* (solid circles), *P. fosteri* (solid square), *P. jinotegensis* var. *jinotegensis* (open triangles), and *P. jinotegensis* var. *morazanensis* (open circle) in Mesoamerica.

American Hwy., 5 Oct. 1977 (fr), *Folsom et al.* 5790 (MO); Cerro Campana, 8°40'N, 79°55'W, 800 m, 17 Aug. 1982 (fr), *Hamilton & D'Arcy* 686 (MO); 23 July 1983 (fl), *Hamilton et al.* 4043 (MO). SAN BLAS: El Llano-Cartí rd., 19.1 km from Interamerican Hwy., 9°19'N, 78°55'W, 100–350 m, 19 Sep. 1984 (fr), *Nevers et al.* 3907 (MO); Cerro Habu, trail from Río Sidro, 9°23'N, 78°49'W, 420–600 m, 20 Dec. 1980 (fr), *Sytsma et al.* 2769 (ENCB, MO).

*Psychotria chagensis* may be recognized readily by its inflorescences consisting of fascicles of several flowers, its large (5–7 × 3–3.5 mm) fruit with conspicuously persistent calyx usually 3–4 mm long, and small leaves (usually 4–7.5 × 1.5–2.5 cm). Leaves appear at the lower end of the given size range in Costa Rica and at the higher extreme in Mexico and Guatemala.

The inserted stamens of the pin morph are longer than the inserted pistil of the thrum (5.5–6.5 vs. 2–5 mm).

**30. *Psychotria erythrocarpa*** Schlechtendahl, *Linnaea* 9: 385. 1834 [1835]. *Uragoga erythrocarpa* (Schldl.) Kuntze, *Revis. Gen. Pl.* 2: 960. 1891. TYPE: Mexico. Hda. de La Laguna (fr), *Schiede* 385 (holotype, B, destroyed, photo & fragment, F neg. no. 519; isotype, K). Figures 2c, 7c, 26.

*Mapouria chamissoana* Loesener, *Verh. Bot. Vereins Prov. Brandenburg* 65: 112. 1923. *Psychotria*

*chamissoana* (Loes.) Standl., *J. Wash. Acad. Sci.* 17: 341. 1927. TYPE: Mexico. Tecolote, Jan. (fr), *Schiede* 1266 (holotype, B, destroyed, photo, F neg. no. 446).

*Shrub* 1–3 m; young stems pale brown to red-brown tomentose or sometimes glabrous, the bark gray, furrowed longitudinally; stipules linear, 8–12 × 1.5–2 mm, glabrous to sparsely tomentose, caducous, leaving a pale ridge with long red-brown fringe to 1 mm long (Fig. 2c). *Leaves* subsessile to petiolate; petioles to 10 mm long, pale tomentose, flat and grooved above; blades membranous, obovate to sometimes elliptic, the apex acute to obtuse to rounded, the base attenuate, (3.5–)5–8(–10) × (1–)1.5–3.5(–5) cm, sparsely pale tomentose to glabrous above, densely tomentose especially near margins to glabrous below, drying green-brown above, paler green below; secondary veins 6–8(–9) pairs, diverging 35°–50°, eucampitodromous to brochidodromous, straight to arcuate near margin, elevated below, dense pale tomentose to glabrous below, the axils sometimes with tufts of pale hair below; tertiary veins inconspicuous, orthogonal reticulate. *Inflorescences* terminal or pseudoaxillary, panicles of cymes or glomerules (Fig. 7c); panicle branched to 3–4 degrees; main axis (1.2–)2.5–5.5 cm long, the peduncle (0.5–)1.5–3 cm long; secondary axes in (2–)3



ranks, the first-rank axes 2, (0.4–)0.8–2 cm long, the second-rank axes 2, (0.2–)0.3–1 cm long, the third-rank axes 2, 0.1–0.3 cm long; cymes branched to 1–2 degrees; bracts triangular, 1.5 × 1 mm. *Flowers* sessile to pedicellate, the pedicels to 1 mm long; calyx cup-shaped, the tube 0.5–1 mm long, the lobes 5, barely evident, red-brown tomentose; corolla white, the tube cylindrical to slightly campanulate, 2–2.5 × 1–1.5 mm, white pubescent in throat, the lobes 5, narrow-triangular, 1.5–2 × 1 mm; stamens 5, the filaments 2–2.5 mm long in pins, 3–3.5 mm long in thrums, the anthers 0.5–0.8 mm long; style 3.5–4 mm long in pins, 2–2.5 mm long in thrums, the branches linear in pins and club-shaped in thrums. *Fruit* ellipsoid when dry, 4.5–6 mm long, 3–4.5 mm diam., maturing red, drying brown, glabrous to pale puberulent when dry; calyx persistent as a beak to 0.5 mm long; seed dorsal surface with 4 deep longitudinal furrows, the ventral surface with 2 very deep longitudinal furrows.

*Distribution* (Fig. 26). Commonly collected in Mexico (primarily Veracruz and Chiapas) and upland Guatemala, and extending to Cayo, Belize, in areas of subevergreen forest with usually tropical-mountainous or sometimes equatorial to subtropical-tropical climate. *Psychotria erythrocarpa* ranges in elevation 0–2,000 m, lower in Veracruz and higher in Chiapas and Guatemala. It has been collected in flower throughout the year, primarily April–July, and in fruit throughout the year, primarily August–January.

*Selected specimens examined.* MEXICO. CHIAPAS: Mpio. La Trinitaria, Hwy. 190 3 mi. S of La Trinitaria, 1,350 m, 27 June 1965 (fl), *Breedlove 10593* (ENCB, F, NY); 12 mi. E of La Trinitaria along rd. to the Lagos de Monte Bello, 1,440 m, 6 Nov. 1965 (fr), *Breedlove 14126* (ENCB, F, NY); Mpio. Terán, 6.5 km W of Tuxtla Gutiérrez along Hwy. 190, 600 m, 8 Oct. 1971 (fr), *Breedlove 20102* (ENCB, MO, NY); Mpio. Villa Corzo, E base of Cerro Tres Picos nr. Cerro Bola along logging rd. SW of Colonia Agronomos Mexicanos, 1,500 m, 9 Feb. 1972 (bud), *Breedlove 23974* (MEXU, MO); Mpio. Cintalapa de Figueroa, 5–7 km NW of Rizo de Oro along a logging rd. to Cerro Baul and Colonia Figueroa, 100 m, 19 Apr. 1972 (fl), *Breedlove 24698* (DUKE, F, MEXU, MO, NY); Mpio. Ocozacoautla de Espinosa, Río de la Venta at the chorreadero nr. Derna, 800–1,000 m, 24 Aug. 1972 (fr), *Breedlove 27360* (DUKE, MO, NY); Mpio. Suchiapa, steep canyon 15 km SW of Suchiapa along rd. to Villa Flores, 750 m, 3 Oct. 1972 (fr), *Breedlove 28265* (DUKE, MEXU, MO, NY); Mpio. Cintalapa de Figueroa, along Río Cintalapa 5–6 km NW of Las Cruces along logging rd. to La Cienega, 850 m, 5 Oct. 1972 (fr), *Breedlove 28450* (DUKE, ENCB, MO, NY); Mpio. Soyaló, 5 km N of Soyaló along rd. to Bochil, 1,300 m, 26 Oct. 1971 (fr), *Breedlove & Thorne 21313* (DUKE, F, MEXU, MO, NY); Mpio. Amatenango del

Valle, creek “Chenek’ Ha’ ” nr. Amatenango, 1,710 m, 28 July 1967 (fr), *Ton 2678* (ENCB, F, MO); Monserrate, 16°33’N, 94°00’W, Apr. 1925 (fl), *Purpus 14334* (A, F); Mpio. Venustiano Carranza, Rancho Carmen along rd. from Acala to Venustiano Carranza, 780 m, 18 July 1966 (fr), *Laughlin 1329* (F, NY). GUERRERO: barr. Cacahuamilpa, 22 Mar. 1941 (st), *Miranda 1935* (MEXU). HIDALGO: San Bartolo Tutotepec, 1,000 m, 3 June 1972 (fl), *Gimate 658* (ENCB, MEXU, SLPM). JALISCO: Estación Biología Chamela, cerca de arroyo Pailles, 8 Dec. 1970 (fr), *Pérez 279* (MEXU). MORELOS: montañas N de Cuernevaca, 2,000 m, 5 Nov. 1972 (fr), *J. Vázquez 3981* (MEXU). OAXACA: 5 km S of Tuxtepec, limestone hill, less than 100 m, 30 Aug. 1974 (fr), *J. Conrad & R. Conrad 3246* (F, GH—3 sheets, MO, NY); Pochutla, Boquerón, camino de Forramoes, 150 m, 7 May 1971 (fl), *Conzatti et al. 3265* (GH); Tehuantepec, Santa Lucía, 1,200 m, 5–6 July 1971 (fl), *T. MacDougall H28* (NY). PUEBLA: Mpio. de Jalpan, Ajenjibre, Nov. 1950 (fr), *Paray 322* (ENCB). SAN LUIS POTOSÍ: Mpio. de Ciudad del Maíz, El Salto, 400 m, 31 July 1960 (fl), *L. González Q. 138* (ENCB); Tamazunchale, 300 m, July 1937 (fr), *Lundell & Lundell 7144* (F, MEXU, NY); El Abra, 10 km E of Ciudad Valles, 1,500 m, 17 June 1956 (fl), *Rzedowski 7772* (ENCB, MEXU, SLPM); Mpio. de Tamasopo, San Nicolás de los Montes, 800 m, 28 May 1959 (fl), *Rzedowski 10664* (ENCB). SINALOA: Mazatlán, Mpio. Rosario, Chametla, Cuacoyolitos, 20 m, (fr), *J. González Ortega 5875* (GH, MEXU, US). TAMAULIPAS: 8 mi. N of Aldama, rd. to San Rafael, oak scrub, 330 m, 10 Dec. 1959 (fr), *M. Johnston 4945* (MEXU); vic. Tampico, 15 m, 1–22 May 1910 (fl), *Palmer 478* (GH, K, MO, NY, US); Mpio. de Ocampo, 3 km NE of Flores Magón, 400 m, 7 Aug. 1969 (early fr), *Puig 5135* (ENCB); Mpio. de Gómez Farías, 2 km E of Gómez Farías, 500 m, 11 June 1982 (fl), *Valiente & Viveros 161* (ENCB, MEXU—2 sheets, MO). VERACRUZ: Mpio. Vega de Altorre, Canada de Mesillas, entrada por Santa Ana, 360 m, 24 July 1981 (fr), *Calzada 7740* (MEXU); Mpio. Coatepec, Cerro de la Palmas entre Jalcomulco y Tuzamapan, 19°23’N, 96°48’W, 800 m, 1 Apr. 1979 (fl), *Castillo & Tapia 501* (MEXU); Isla Lobos, 0 m, 1 June 1966 (fl), *E. Chávez s.n.* (ENCB, MEXU); Mpio. de Naolinco, corriente de lava al S de La Concepción, 1,000 m, Aug. 1973 (fr), *Chazaro & Dorantes 255* (ENCB, MEXU); Mpio. Ozuluama, 5 km adelante de Ozuluama, hacia Tampico, 6 Dec. 1970 (fr), *Chiang 224* (GH, MEXU); carret. Nautla a Veracruz, 1 km al S del Raudel, 20 m, 15 July 1977 (fl), *Fay & Calzada 927* (ENCB, F, NY, US); carret. San Andrés Tuxtla a Alvarado 6 km, 100 m, 6 July 1977 (fl), *Fay & C. Hernández 832* (F, US); Mpio. Apazapan, 2 km NE of Emiliano Zapata (= Carrizal), 19°23’N, 96°38’W, 400 m, 27 June 1980 (fl), *Hansen & Nee 7522* (F, MO); Atoyac, 14 May 1937 (fl), *Matuda 1484* (MEXU), *Matuda S-4* (A, F, MO); Casitas-Gutiérrez Zamora, cerca ejido villa Cuauhtemoc, 30 m, 21 June 1970 (fl), *Nevling & Gómez-Pompa 1163* (GH, MEXU); Coatzacoalcos, 21 Mar. 1910 (fl), *Orcutt 3106* (F); Cerro Monte de Oro, 300 m, 20 June 1972 (fl), *C. Vázquez Y. 614* (MEXU); Mpio. Coetzala, limites con Omealca, 600 m, 16 July 1976 (fr), *V. Vázquez T. 458* (ENCB, MEXU—2 sheets); Mpio. Puente Nacional, 50 m, 16 Oct. 1970 (fr), *Ventura 2635* (ENCB, MEXU); Mpio. de Totutla, Mata Oscura, 750 m, 25 Nov. 1971 (fr), *Ventura 4575* (ENCB); Mpio. de Dos Ríos, Cerro Gordo, 450 m, 15 Jan. 1975 (fr), *Ventura 10809* (ENCB, MO). GUATEMALA. BAJA VERAPAZ: 13 km S of turnoff to



Salamá on hwy. to Cobán, 1,000 m, 14 July 1977 (early fr), *Croat 41119* (MO); 5 km SE of Granados, 15 July 1970 (early fr), *Harmon & Dwyer 3105* (ENCB, F, GH, MO, US); 6 km from Rabinal, rd. to Guatemala City, thickets of Pachirax River, Sierra Chuacús, 1,140 m, 2 Oct. 1972 (fr), *A. Molina R. & A. Molina 27784* (F). CHIQUIMULA: between Chiquimula and La Laguna, 500–1,000 m, 27 Oct. 1939 (fr), *Steyermark 30684* (F). ESCUINTLA: sin. loc., 1942 (fr), *J. I. Aguilar 1729* (F). GUATEMALA: Estancia Grande, 600 m, 8 Dec. 1938 (st), *Standley 59208* (F). HUEHUETENANGO: between Nentón and Las Palmas, via Yalisjao, Rincón Chiquite, Chiaquial, Guaxacaná, in Sierra de los Cuchumatanes, 800–1,200 m, 30 Aug. 1942 (fr), *Steyermark 51630* (F); mountains nr. El Reposo, 8 km from Mexican frontier, 900–1,000 m, 14–18 Dec. 1972 (fl), *L. O. Williams et al. 41394* (F, US). IZABAL: St. Thomas, 29 May 1909 (fl), *Deam 6047a* (GH, US). JALAPA: hills NE of Jalapa, rocky scrub-oak forest, 1,400–1,600 m, 10 Nov. 1940 (fl), *Standley 76783* (F); mountains along rd. between Jalapa and San Pedro Pinula, 1,400–1,800 m, 12 Nov. 1940 (fr), *Standley 77070* (F). JUTIAPA: vic. Jutiapa, 850 m, 24 Oct.–5 Nov. 1940 (fr), *Standley 76317* (F, NY, US); quebrada above Ovejero, on rd. between Monjas (Dept. Jalapa) and El Progreso, 1,400 m, 19 Nov. 1940 (st), *Standley 77633* (F). QUICHÉ: sin. loc., 1942 (fl), *J. I. Aguilar 1143* (F); 1942 (fr), *J. I. Aguilar 1371* (F). ZACAPA: Loma El Picacho, above Santa Rosalía, dry SW-facing rocky slopes and bluffs of metamorphosed dolomitic rock, 1,200–1,600 m, 15 Jan. 1942 (st), *Steyermark 42705* (F, NY). BELIZE. CAYO: Cuevas de Río Frío, a 1 km al O de Augustine, 400 m, 2 Sep. 1973 (fr), *Sousa 4183* (MEXU).

A minority of glabrous individuals appear in many populations of *Psychotria erythrocarpa* (D. Lorence, pers. comm.), so *P. chamissoana*, defined by its glabrous aspect, is included within *P. erythrocarpa*.

*Psychotria erythrocarpa* may be recognized by its usually pale brown to red-brown tomentose aspect, obovate leaves with few (usually 6–8) secondary veins diverging acutely (35°–50°), and small (usually 2.5–5.5 cm long) inflorescences with secondary axes two per rank in three ranks. The fruits occupy the small end of the spectrum in Veracruz and the large end in Chiapas and southward.

**31. *Psychotria fosteri*** C. Hamilton, *Phytologia* 64: 224. 1988. TYPE: Panama. Veraguas: Playa Rosario, northern tip of Coiba Island, 26 Aug. 1970 (fl, fr), *Foster 1605* (holotype, DUKE; isotypes, F, GH, MO). Figure 26.

*Shrub* ca. 1 m high; young stems glabrous, the bark slightly furrowed longitudinally; stipules sheathing, narrow, with 2 triangular lobes, the sheath 8–12 × 1–3 mm, the lobes 2–3 mm long, fringed, with darker red-brown midrib leading to apex of each lobe, caducous, leaving a red-brown ridge with irregular fringe. *Leaves* petiolate; peti-

oles 5–10 mm, glabrous, flat above; blades membranous, elliptic-obovate, the apex acuminate to mucronate, the base attenuate, (6–)8–12 × (2–)3–5 cm, glabrous above and below, drying green-brown above, deep red-brown below; secondary veins 11–14 pairs, diverging 70°–80°, brochidromous often with collector vein distinct, slightly arcuate, prominulous below, glabrous, drying deeper red-brown than blade, the axils lacking domatia or hairs; tertiary veins inconspicuous, reticulate. *Inflorescences* terminal, fascicles of several flowers, ca. 8 mm long, 10 mm across; peduncles lacking; bracts broadly triangular, irregularly cleft, ca. 5 × ca. 5 mm, fringed. *Flowers* sessile; calyx cup-shaped, the tube 1.5 mm long, the lobes 5, triangular, 0.5–1 × 0.5 mm, slightly fringed; corolla white, the tube cylindrical, 3.5 × 0.8 mm, white pubescent in throat, the lobes 5, triangular, 2 × 0.7 mm; stamens 5, the filaments 3 mm long in pins, not seen in thrums, the anthers 0.5 mm long; style 4–4.5 mm long in pins, not seen in thrums, the branches linear. *Fruit* when dry ellipsoid, 5–6 mm long, 2.5–3 mm diam., maturing orange (probably to red), drying dark red-brown; calyx persistent, the tube 1–1.5 mm long, the lobes ca. 1 mm long; seed dorsal surface with 5 longitudinal furrows, the ventral surface with 2 longitudinal furrows.

*Distribution* (Fig. 26). Known only from the type collection from Coiba Island, Panama, in tropical moist forest with tropical-equatorial climate. It was collected in flower and fruit on August 26.

*Psychotria fosteri* may be recognized as a magnified version of *P. chagrensis*, having an inflorescence consisting of a fascicle of flowers and fruit ellipsoid with a conspicuous persistent calyx. *Psychotria fosteri* differs in having larger (sheath 8–12 vs. 4–7 mm long) biaristate (vs. aristate) stipules, larger mature leaves (usually 8–12 × 3–5 vs. 4–7.5 × 1.5–2.5 cm), shorter calyx lobes (0.5–1 vs. 2–2.5 mm), and much shorter corolla tubes (3.5 vs. 6–7 mm).

The lone flowering collection is a pin morph.

**32. *Psychotria fruticetorum*** Standley, *J. Arnold Arbor.* 11: 42. 1930. TYPE: Honduras. Comayagua: vic. Siguatepéque, 1,080–1,400 m, 14–27 Feb. 1928 (fr), *Standley 56197* (holotype, F; isotype, A). Figure 25.

*Shrub*, 0.5–3 m tall; young stems glabrous, the bark red-brown or pale, smooth; stipules sheathing, biaristate with extensions arising from apical corners of sheath, 1.5–2 × 1.5–2 mm, glabrous,



caducous, leaving a pale or red-brown ridge with or without fringe. *Leaves* petiolate; petioles 2–5 mm long, glabrous, flat above; blades membranous to subcoriaceous, elliptic to slightly obovate, the apex acute to acuminate, the base narrowly cuneate to attenuate, the margin often inrolled, (3–)5–7(–9) × (1–)2–4(–4.5) cm, glabrous above and below, drying chalky yellow-green to red-brown; secondary veins (4–)5–7(–8) pairs, diverging 55°–65°, eucamptodromous, straight then constantly arcuate toward margin, barely elevated below, glabrous, the axils often with minute tufts of white hairs below; tertiary veins inconspicuous, orthogonal reticulate. *Inflorescences* terminal or pseudoaxillary, panicles of cymes; panicle branched to 3 degrees; main axis 1.5–4.5 cm long, the peduncle 0.3–2.5 cm long or rarely lacking; secondary axes in (2–)3–4(–5) ranks, the first-rank axes 2 or 4, the longer pair 0.5–1.8 cm long, the shorter pair when present 0.5 cm long, the second-rank axes 2, 0.1–1.1 cm long, the third-rank axes 2(4), the longer pair 0.2–0.7 cm long, the shorter pair when present 0.2 cm long, the fourth-rank axes 2, 0.4–0.5 cm long, the fifth-rank axes 2, 0.3 cm long; cymes branched to 2 degrees; bracts broad, irregular, to 1 mm long, glabrous to puberulent, often minutely fringed. *Flowers* on pedicels 0.5–1 mm long; calyx cup-shaped, the tube 0.5 mm long, the lobes 5, triangular to barely evident, to 0.5 × 0.5 mm, often minutely fringed; corolla white, the tube cylindrical, 2 × 1.5 mm, white pubescent in throat, the lobes 5, linear, 1.5–2 × 1 mm; stamens 5, the filaments 1.5–2 mm long in pins, 3–3.5 mm long in thrums, the anthers 0.8 mm long; style 3.5–5 mm long in pins, 2.5 mm long in thrums, the branches short, linear, often recurved. *Fruit* when dry ellipsoid, 4–5 mm long, 3–3.5 mm diam., maturing red, drying red-brown; persistent calyx to 0.5 mm long; seed dorsal surface with 4 deep longitudinal furrows, the ventral surface with 2 deep longitudinal furrows.

*Distribution* (Fig. 25). Widespread from Mexico through Panama, mostly on the Caribbean side, with greatest concentration in Belize and eastern Petén, Guatemala, in tropical to premontane moist forest with equatorial to tropical climate. *Psychotria fruticetorum* ranges in elevation 0–2,000 m, reaching over 1,300 m only in Mexico and parts of Guatemala. It has been collected in flower throughout the year, primarily March–July, and in fruit throughout the year.

*Selected specimens examined.* MEXICO. CAMPECHE: Tuxpeña, 13 Dec. 1931 (fr), *Lundell 1062* (F). CHIAPAS: Mpio. Tenejapa, Ala Shashib River below Habenal, paraje

of Mahben Chauk, 990 m, 15 July 1964 (fl), *Breedlove 6489* (F, NY); Mpio. Ocozocoautla de Espinosa, selva del Ococe 32 km NW of Ocozocoautla, 600 m, 27 Aug. 1972 (fr), *Breedlove 27427* (MEXU, MO); Mpio. Ocosingo, nr. Laguna Ocotol Grande, 800 m, 27 Nov. 1972 (fr), *Breedlove & Dressler 29846* (MEXU). HIDALGO: Mpio. de Juárez-Hidalgo, barrancas al N de Juárez-Hidalgo, 1,800 m, 10 May 1981 (fl), *R. Hernández M. et al. 6114* (MEXU, MO); Mpio. de Molango, 3 km SW of Molango, 1,600 m, 2 May 1980 (fl), *G. Pérez S. 574* (ENCB, MEXU—2 sheets). QUINTANA ROO: carret. Chetumal–Felipe Carrillo Puerto, 15 Nov. 1980 (fr), *Cabrera & Cortés 343* (MEXU); 110 km SW of Chetumal, 8 km N of Unión, 100 m, 7 May 1982 (fl), *Davidse et al. 20183* (MO); Mpio. Felipe Carrillo Puerto, 21 Aug. 1971 (fr), *G. Pérez S. 411* (ENCB, MEXU). TABASCO: Mpio. Huimanguillo, km 15 de Huimanguillo a Francisco Rueda, 12 June 1979 (fl), *Cowan 2284* (ENCB, MEXU); Balancán, La Palma, 1–6 June 1939 (fr), *Matuda 3266* (A, F, MEXU, NY); Mpio. Huimanguillo, 1 km al N de Chontalpa, 12 Nov. 1971 (fr), *Puig 322* (ENCB, MEXU). VERACRUZ: Mpio. de Huayacocotla, camino a Rancho Nuevo, 1,600 m, 8 Mar. 1972 (fl, fr), *R. Hernández M. & B. Rosales A. 1559* (MEXU). GUATEMALA. ALTA VERAPAZ: Chahal, El Mago, ca. 90 m E of Sebol Road, 15 Oct. 1968 (fr), *Contreras 7938* (F, NY); Rubelsanto, Balasterra, 23 July 1975 (fl), *Lundell & Contreras 19548* (MO); SW of Lanquín, vic. caves, 600–1,000 m, 21 Feb. 1942 (st), *Steyermark 44128* (F, US); savanna N of Concepción, 3–5 mi. SE of Finca Yalpemech, nr. Alta Verapaz–Petén boundary, 100–110 m, 23 Mar. 1942 (fl), *Steyermark 45272* (F, NY). CHIQUIMULA: 3 mi. SE of Quezaltepeque, Montaña Castilla, vic. Montaña, Cebollas, along Río Lucía Saso, 1,200–1,500 m, 6 Nov. 1939 (fr), *Steyermark 31237* (F); *Steyermark 31321* (F). IZABAL: Cadenas/Puerto Méndez, 8 Sep. 1969 (fr), *Contreras 9099* (MO); vic. Quiriguá, 75–225 m, 15–31 May 1922 (fl), *Standley 23922* (GH, US); *Standley 24248* (GH, US); seashore around Punta Palma, across bay from Puerto Barrios, 22 Apr. 1940 (st), *Steyermark 39830* (F). PETÉN: San Clemente to Dos Arroyos, 1 May 1931 (fl), *Bartlett 12819* (F, US); Tikal, on top of Temple IV, 28 June 1960 (fl), *Contreras 1192* (DUKE, F, NY); La Cumbre, W of km 139 on Cadenas Road, 23 Sep. 1966 (fr), *Contreras 6198* (F, NY); Carmelita, in thicket bordering aviation field, 2 July 1942 (fr), *Egler 42-302* (F); Tikal National Park, Bajo del Hormiguero, 6 July 1959 (fl, fr), *Lundell 16214* (DUKE, MEXU, NY); km 62 of Flores–Poptún Rd., 16 Sep. 1976 (fr), *Lundell & Contreras 20369* (MO); +35 km E de Sta. Elena, brecha El Remate-Tikal, 200 m, 9 Nov. 1965 (fr), *A. Molina R. 15443* (F, NY, US); sitio arqueológico en el camino que conduce a cienaga “Bajo la Juventud,” km 10 lado E de la aldea Uaxactún, 26 May 1973 (fl), *Ortiz 2655* (ENCB, F, MO, NY). BELIZE. BELIZE: Gracie Rock, 8 June 1974 (fl), *Dwyer 12787* (MO, US); Maskall, Nov. 1933 (fr), *Gentle 946* (A, F, MO, NY); 9 Apr. 1934 (fl), *Gentle 1188* (A, F, GH, K—2 sheets, MO, NY, US); Isabella Pine Ridge, June 1933 (fl), *Lundell 4243* (F); nr. Manatee Lagoon, pine ridge, 9 June 1905 (fl), *Peck 23* (GH, K). CAYO: Duck Run, 11 May 1931 (fl), *Bartlett 13122* (F, K); vic. Cuevas S of Millionario, 600 m, 29–30 May 1973 (fl), *Croat 23589* (F, MO); Mountain Pine Ridge, San Agustín, banks of Río Frío, July–Aug. 1936 (fr), *Lundell 6702* (F, GH, NY, US). COROZAL: 1.5 km N of Buena Vista, 1.5 km W of Northern Highway on secondary rd., 23 June 1973 (early fr), *Dwyer 11373A*



(F, MO, NY); Corozal-Consejo rd., Aug. 1933 (fr), *Gentle 4913* (NY). ORANGE WALK: Mile 50 Northern Highway to New River Toll Bridge, 7 June 1974 (fl), *Dwyer 12746* (GH, MO—2 sheets); Honey Camp, 19 Oct. 1929 (fl, fr), *Lundell 617* (F, GH, K, MO—2 sheets, NY, US). STANN CREEK: Silk Grass Creek Reserve, 20 Sep. 1939 (fr), *Gentle 3002* (A, F, K, MEXU, NY); Stann Creek Valley, Big Eddy Ridge, 6 Apr. 1941 (fl), *Gentle 3546* (A, MO, NY); Mullins River Rd., swampy places, 30 m, 1 June 1929 (fl), *Schipp 204* (A, F, GH, K, MO, NY, US). TOLEDO: San José, 6.7 mi. N of Columbia Forest Station, 13 June 1973 (fl), *Dwyer 11150* (MO); Río Temash, between 3 km upriver and mouth, 26 July 1979 (fr), *Dwyer 14779* (MO); Monkey River, 25 Aug. 1941 (fr), *Gentle 3600* (A, K, MO, NY, US); mi. 13 on rd. W from Punta Gorda, nr. junction of Southern Hwy. and rd. to San Antonio, 30 m, 14 June 1973 (fl), *Gentry 8212* (DUKE, MO). HONDURAS. COMAYAGUA: 3 km S of Siguatepéque, 1,300 m, 9 Jan. 1969 (fr), *A. Molina R. 23303* (F, NY). COPÁN: Qda. La Honduras, 2 km NO de Santa Rosa de Copán, 1,000 m, 15 Feb. 1982 (fr), *Mejía 124* (TEFH). FRANCISCO MORAZÁN: 1 km from Agalteca, 800 m, 22 Nov. 1966 (fr), *A. Molina R. 18705* (F, NY). GRACIAS A DIOS: Puerto Lempira, orilla laguna de Caratusca, 5–8 Sep. 1978 (fr), *C. Nelson 4828* (TEFH); camino entre Dursuna y Mocerón, 70 m, 14–21 Feb. 1979 (fr), *C. Nelson & Vargas 4906* (TEFH). LA PAZ: Agua Blanca River between Chinacla and Planes de Mulle, 1,300 m, 22 Mar. 1969 (fr), *A. Molina R. & A. Molina 24350* (F—2 sheets, NY). LEMPIRA: aguas termales, 4 km de Gracias, 1,000 m, 7–9 Dec. 1971 (fr), *C. Nelson et al. 91* (MO). OCOTEPEQUE: between El Agua Caliente and Machuca, hwy. to Guatemala-Honduras border, 1,000 m, 4 Sep. 1975 (fr), *A. Molina R. & A. Molina 31091* (ENCB, F, MO). SANTA BARBARA: al N de Sta. Barbara, región La Cuesta, 500 m, 13 Dec. 1950 (fr), *A. Molina R. 3784* (F, GH). NICARAGUA. CHONTALES: Hda. Corpus, W of Juigalpa, 12°07'N, 85°28'W, 100 m, 5 Sep. 1982 (early fr), *W. D. Stevens 21782* (MO). MATAGALPA: 7 km al SO de Buenavista, carret. a Matagalpa, 13°15'N, 85°24'W, 300–440 m, 1 Mar. 1983 (fr), *P. P. Moreno & Robledo 21016* (MO); Hda. Sta. María de Ostuma, 1,300–1,600 m, 17 Jan. 1977 (st), *Tomlin 145* (MO). RIVAS: Isla de Ometepe, al lado N del Volcán Concepción, 11°34'N, 85°37'W, 250–350 m, 12 Mar. 1981 (fr), *Sandino 545* (MO). ZELAYA: Prinzapolka, 23 June 1978 (fr), *Neill 4551* (MO); Caño El Hormiguero, on E slope of El Hormiguero, 13°46'N, 84°59'W, 750–800 m, 17 Mar. 1980 (fr), *Pipoly 6104* (MO); nr. Tala Has and Puente Mango, over Río Kisalaya, 14°41'N, 84°03'W, 40–60 m, 18 Apr. 1978 (fl), *W. D. Stevens 7597* (MO); rd. to Panua, entrance ca. 7.6 km NW of Sta. Marta, 4.2–5.0 km from main rd., 14°18'N, 83°41'W, 30–40 m, 20 Apr. 1978 (fl), *W. D. Stevens 7761* (MO); SW of Bluefields, 11°59'N, 83°46'W, 10–40 m, 2–3 Apr. 1981 (fl), *W. D. Stevens 19836* (MO); vic. jct. of rd. to Alamikamba with rd. between El Empalme and Limbaika, 13°32'N, 84°30'W, 25 m, 4 July 1982 (fl, fr), *W. D. Stevens 21675* (MO); 4 km N of Puerto Cabezas, 10–20 m, 11 June 1978 (fr), *Vincelli 533* (MO). PANAMA. CANAL AREA: Ancón Hill, 25 Feb. 1923 (fr), *Piper 5554* (US). PANAMÁ: nr. Calzada Larga, swampy area over exposed limestone, 27 Sep. 1970 (fl, fr), *Croat 12389* (F, GH, MO, NY); San José Island, Perlas archipelago, 13 June 1945 (fl), *Erlanson 279* (GH, NY, US); 8 Jan. 1946 (fl, early fr), *I. Johnston 1071* (GH, MO, US); along Río Tocumen, N of Chepo rd., 0–30 m, 27 Jan. 1935

(fl), *Hunter & Allen 240* (MO); southern tip of Isla de Rey, Punta de Cocos, 8°17'N, 78°55'W, 0–20 m, 19 Jan. 1982 (fl, fr), *Knapp & Mallet 2948* (MO). SAN BLAS: mainland opposite Isla Mosquito (Kwitupu), 19 Oct. 1966 (fr), *Duke 8989* (MO—2 sheets).

*Psychotria fruticetorum* may be recognized by its small leaves (usually 5–7 × 2–4 cm) drying chalky yellow-green to red-brown with barely elevated secondary veins and inconspicuous tertiaries, its small inflorescences (1.5–4.5 cm long) with secondary axes usually 2 per rank in 3–4 ranks, and small (4–5 × 3–3.5 mm) ellipsoid fruit. Mexican collections differ from those from the rest of the range in having generally smaller leaves, 5 vs. 6–7(8) secondary veins, and a higher fruit length-to-diameter ratio.

The exerted pistil of the pin morph is often longer than the exerted stamens of the thrum (3.5–5 vs. 3.5–4 mm).

**33. *Psychotria jinotegensis*** Nelson, Molina & Standley, *Phytologia* 50: 1. 1981. TYPE: Nicaragua. Jinotega: region of La Montañita and Las Mesitas, in sierra W of Jinotega, ca. 1,100–1,400 m, 29 June 1947 (fl), *Standley 10314* (holotype, EAP, n.v.; isotype, F, n.v.). Figures 9d, 26.

*Shrub* (0.5–)1–4(–6) m tall; young stems ferruginous-pubescent or very sparsely tomentose, the bark smooth; stipules sheathing, ovate to linear, 15–23 × 4–6 mm, usually ferruginous-pubescent, caducous, leaving a pale ridge with dark red-brown fringe. *Leaves* petiolate; petioles 0.5–1.5 cm long, pubescent or glabrous, flat above; blades membranous, elliptic to oblanceolate, the apex acute or sometimes acuminate, the base attenuate, (7–)9–14(–15.5) × (2–)2.5–4.5(–5.5) cm, pale tomentose or glabrous above, densely pubescent or glabrous below, drying gray-green to red-brown; secondary veins 9–14 pairs, diverging 40°–50°, eucamptodromous to brochidodromous, straight then arcuate near margin, elevated below, pubescent or glabrous below, the axils with tufts of hairs below; tertiary veins evident, orthogonal reticulate to slightly percurrent. *Inflorescences* terminal or pseudoaxillary, few-branched panicles of condensed cymes; panicle branched to 3–4 degrees; main axis (2.5–)4–6.5 cm long, the peduncle lacking or to 1(–3) cm long; secondary axes in (2–)3 ranks, the first-rank axes 1–2, (1–)1.5–5 cm long, the second-rank axes 2, 0.5–2.5 cm long, the third-rank axes 2(4), the longer pair 0.2–0.8 cm long, the shorter pair when present 0.1 cm long; cymes branched to (1)2 degrees; bracts and bracteoles



linear, 1.5–3 mm long; usually ferrugineous-pubescent. *Flowers* sessile or on pedicels to 1.5 mm long; calyx cup-shaped, the tube cylindrical, 0.5–1 mm long, the lobes 5–6, triangular, 0.5–1 × 0.7 mm, puberulent; corolla white, the tube cylindrical to campanulate, 3.5–4 × 1.5–2 mm, white pubescent in throat, the lobes 5–6, 1.5–2.5 × 1.2 mm; stamens 5–6, the filaments 3 mm long in pins, 5–5.5 mm long in thrums, the anthers 1 mm long; style 5 mm long in pins, 3–4 mm long in thrums, the branches linear. *Fruit* when dry ellipsoid, (5–) 5.5–6.5 mm long, 4–5 mm diam., maturing red, drying red-brown, ferrugineous-pubescent or glabrous; persistent calyx conspicuous, 1–3 mm long (Fig. 9d); seed dorsal surface with 6–8 irregular longitudinal furrows, the ventral surface with 2 deep regular plus several irregular longitudinal furrows.

*Distribution* (Fig. 26). Known from southeastern Guatemala through northwestern Nicaragua in tropical moist forest with tropical to tropical-mountainous climate.

*Psychotria jinotegensis* may be recognized by its usually ferrugineous aspect, elliptic to oblanceolate leaves with secondary veins diverging 40°–50°, and ellipsoid fruit with conspicuous (1–3 mm long) persistent calyx tube.

KEY TO THE VARIETIES OF *PSYCHOTRIA JINOTEGENSIS*

- 1a. Ferrugineous-pubescent and/or tomentose on young stems, both leaf surfaces, and on dry fruit; secondary vein axils with tufts of reddish hairs ..... 30a. var. *jinotegensis*  
 1b. Generally glabrous or only sparsely tomentose; secondary vein axils with tufts of white hairs ..  
 ..... 30b. var. *morazanensis*

**33a. *Psychotria jinotegensis*** Nelson, Molina & Standley var. ***jinotegensis***. Figure 26.

*Shrub*; young stems ferrugineous-pubescent. *Leaves*: petioles ferrugineous-pubescent; blades pale tomentose above, densely ferrugineous-pubescent below, drying green-brown to deep red-brown; secondary veins (9–)10–14 pairs, ferrugineous-pubescent, the axils with tufts of reddish hairs below. *Fruit* when dry ferrugineous-pubescent.

*Distribution* (Fig. 26). Known from southeastern Guatemala eastward across southern Honduras and northern El Salvador to northwestern Nicaragua at elevations of 1,000–2,000 m. It has been collected in flower June–July and December–February and in fruit August–February.

*Selected specimens examined*. GUATEMALA. BAJA VERAPAZ: Unión Barrios, 27 Feb. 1972 (fr), *Contreras 11062* (MO); along hwy. to Cobán, ca. 1.5 km S of turnoff to Salamá, pine forest, 1,300 m, 16 July 1977 (early fr), *Croat 41138* (MO); nr. La Unión (Barrios), Sierra de las Minas, 1,800 m, 18 Jan. 1974 (fl, fr), *L. O. Williams et al. 43559* (F). CHIQUIMULA: Montaña Nonojá, 5–8 km E of Camotán, 600–1,800 m, 11 Nov. 1939 (fr), *Steyermark 31675* (F). EL PARAISO: between Calera and middle slopes of quebradas of Volcán Siglo, 2,000–2,200 m, 20 Jan. 1942 (fr), *Steyermark 42992* (F, US). HONDURAS. COMAYAGUA: ravine nr. El Achote, hills above plains of Siguatepeque, 1,350 m, 30 July 1936 (early fr), *Yuncker et al. 6229* (F, GH, K, MO). DISTRITO CENTRAL: 2.5 km N of Zambrano along rd. to San Francisco de Soroguara, 1,370 m, 1 July 1970 (fl), *Davidse & Pohl 2245* (F, MO, NY); nr. Zambrano, 26 Sep. 1969 (fr), *Lauvert & Barkley 39552* (MO, TEFH); San Matías NO de Tegucigalpa, 1,400 m, 25 Sep. 1983 (fr), *Paredes 97* (TEFH). EL PARAISO: drainage of Río Yeguaré, márgenes del Río Lizapa entre Guinope y Las Casitas, 1,300 m, 1 Nov. 1950 (fr), *A. Molina R. 3357* (MO); Francisco Morazán, Cerro Canta Gallo, 14 km NE de Tegucigalpa, 1,046 m, 2 Oct. 1983 (fr), *M. Castro M. 83* (TEFH); along Río Rancho Quemado, S of Tegucigalpa, km 20–25 on rd. to Sabana Grande, 1,300 m, 9 Nov. 1966 (fr), *A. Molina R. 18648* (GH, NY). INTIBUCÁ: 2 km de La Esperanza, orillas de La Pozona, 28 June 1974 (fl), *J. Martínez & Bejarano 236* (TEFH). EL SALVADOR. CHALATENANGO: S del Río Nomiapa, La Palma, 1,100 m, 6 July 1976 (early fr), *Montalvo 4695* (MO). NICARAGUA. JINOTEGA: sierra W of Jinotega, trail to Cerro de la Cruz, 1,050–1,350 m, 27 June 1947 (fl), *Standley 10214* (F).

**33b. *Psychotria jinotegensis*** Nelson, Molina & Standley var. ***morazanensis*** C. Hamilton, *Phytologia* 64: 226. 1988. TYPE: El Salvador. Morazán: easternmost peak, Montes de Caguatique, nr. summit on N side, 13°46'N, 88°13'W, 1,500 m, 25 Dec. 1941 (fr), *Tucker 610* (holotype, US; isotypes, F, K, NY). Figure 26.

*Shrub*; young stems very sparsely tomentose. *Leaves*: petioles glabrous; blades glabrous above and below, drying gray-green to pale red-brown; secondary veins 9–11 pairs, glabrous, the axils with tufts of whitish hairs below. *Fruit* glabrous when dry.

*Distribution* (Fig. 26). Known only from the type collection from eastern El Salvador, at ca. 1,500 m. This variety was collected in fruit December 25.

**34. *Psychotria mirandae*** C. Hamilton, *Phytologia* 64: 229. 1988. TYPE: Mexico. Chiapas: Berriozábal a Las Vistas, 17 July 1949 (fl), *Miranda 5395* (holotype, US; isotype, MEXU). Figure 27.

*Shrub* ca. 1 m tall; young stems red-brown tomentose, the bark pale, smooth; stipules sheath-



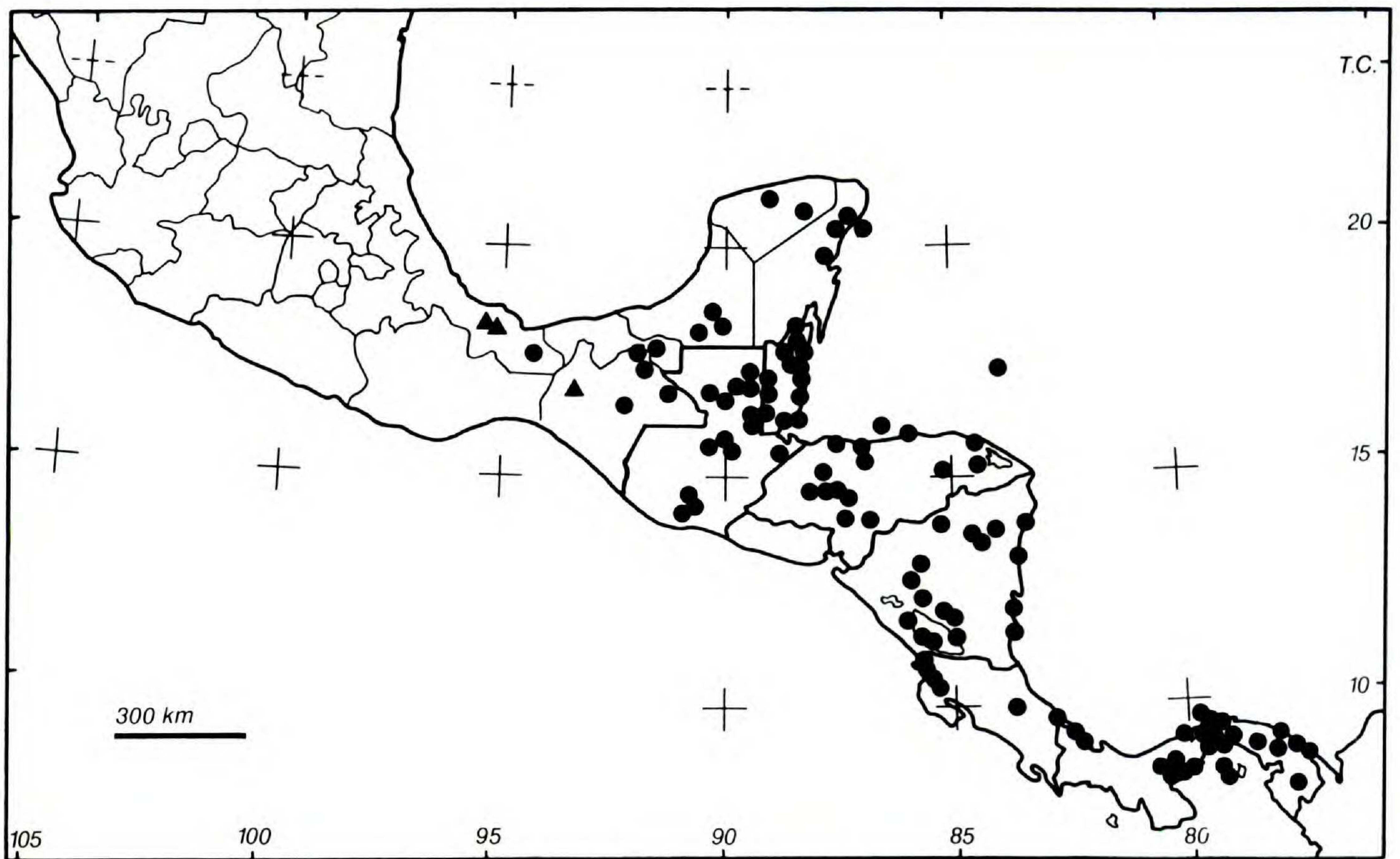


FIGURE 27. Distributions of *Psychotria mirandae* (triangles) and *P. nervosa* (circles) in Mesoamerica.

ing, rounded at apex, 4–8 × 3–4 mm, red-brown tomentose outside, caducous, leaving a pale ridge. *Leaves* subsessile to petiolate; petioles 1–4 mm long, red-brown tomentose, furrowed above; blades membranous, narrowly obovate, the apex caudate, the base attenuate, 6–12 × 2–4 cm, glabrous above and below, drying dull red-brown; secondary veins 7–10 pairs, diverging 48°–55°, eucamptodromous, slightly arcuate, prominent below, red-brown sparsely tomentose below, the axils with small tufts of hair below; tertiary veins evident, reticulate to slightly percurrent. *Inflorescences* terminal, fascicles of flowers or with several short axes, 1–1.5 cm long, 1–2.5 cm across; peduncle lacking; bracts triangular, 0.5 × 0.5 mm, glabrous to sparsely tomentose. *Flowers* subsessile, the pedicels 1–2 mm long; calyx cylindrical, the tube 2–2.5 mm long, the lobes 5, linear, 2–3 × 1.2 mm, sparsely ciliate on margin; corolla white(?), the tube cylindrical, 3 × 1 mm, white pubescent in throat, the lobes 5, linear, 1.5–2 × 0.5 mm; stamens 5, the filaments not seen in pins, 4 mm long in thrums, the anthers 0.8 mm long; style not seen in pins, 2.5–3 mm long in thrums, the branches club-shaped. *Fruit* ellipsoid when dry, 5–7 mm long, 4–5 mm diam., maturing red, drying red-brown, red-brown tomentose; calyx persistent, the tube 2–2.5 mm long, the lobes ca. 2 mm long; seed dorsal surface with 5 longitudinal furrows, the ventral surface with 2 longitudinal furrows.

*Distribution* (Fig. 27). Limited to eastern Veracruz and northwestern Chiapas, Mexico, at 700–1,000 m elevation in evergreen forest with equatorial-tropical to tropical climate. It has been collected in flower in March and May–July and in fruit in August and December.

*Additional specimens examined.* MEXICO. CHIAPAS: Mpio. Berriozábal, 13 km N of Berriozábal nr. Pozo Turipache and Finca El Suspiro, 900 m, 15 May 1973 (fl), *Breedlove 35316* (MEXU); Cerro de San Martín, Mar. 1845 (fl), *Galeotti 2684* (F—3 sheets, US); Berriozábal a Las Vistas, 4 Dec. 1949 (fr), *Miranda 5834* (MEXU, US); San Fernando, Predio del Rosario, 21 June 1951 (fl), *Miranda 7216* (MEXU). VERACRUZ: Mpio. Catemaco, cerro entre Zapoapan y San Juan Seco al SW de Lago Catemaco, 700 m, 7 June 1972 (fl), *Beaman 6094* (F, MEXU—2 sheets); region of San Andrés Tuxtla, nr. Zapoapan, SE of Catemaco, 17 Aug. 1953 (fr), *Dressler & Jones 93* (GH, NY, US); Catemaco, 25 Mar. 1956 (fl), *Paray 1946* (ENCB); km 156.5 of Veracruz–Coatzacoalcos rd., 13 July 1974 (fl), *Sohmer 9409* (MEXU).

*Psychotria mirandae* may be recognized first by its marked resemblance to *P. nervosa* and second by its contracted (sometimes contracted to fascicles of flowers) inflorescences and wider (4–5 mm vs. 2.5–3 mm diam. in *P. nervosa*) fruit with persistent calyx having a conspicuous tube and lobes ca. 4 mm long.

The seven flowering collections examined are all of the thrum morph, which suggests strongly that the species is thrum-monomorphic.



**35. *Psychotria nervosa*** Swartz, Prodr., 43. 1788. TYPE: Jamaica. (fl), *Swartz s.n.* (holotype, S, n.v., photo, A). Cf. also Swartz, Fl. Ind. Occid., 403. 1797. Figure 27.

*Psychotria undata* Jacquin, Pl. Hort. Schoenbr. 3: 5, pl. 260. 1798. *Uragoga undata* (Jacq.) Baill., Hist. Pl. 7: 371. 1880. *Uragoga undata* (Jacq.) Kuntze, Revis. Gen. Pl. 2: 958. 1891. *Myrstiphyllum undatum* (Jacq.) Hitchc., Annual Rep. Missouri Bot. Gard. 4: 95. 1893. TYPE: Bahamas. July–Aug. (fl), Coll. ign. (n.v.).

*Psychotria rufescens* Kunth in Humboldt, Bonpland & Kunth, Nov. Gen. Sp. 3: 364. 1819. *Uragoga rufescens* (Kunth) Kuntze, Revis. Gen. Pl. 2: 962. 1891. *Psychotria nervosa* subsp. *rufescens* (Kunth) Steyerl., Mem. New York Bot. Gard. 23: 480. 1972. Non *Psychotria rufescens* Roem. & Schultes (which is a synonym of *Psychotria micrantha* Kunth), Syst. Veg. 5: 192. 1819. TYPE of *P. rufescens* Kunth: Peru? (holotype, P, n.v.).

*Psychotria hirta* Roemer & Schultes, Syst. Veg. 5: 191. 1819. *Psychotria nervosa* subsp. *rufescens* var. *hirta* (Roem. & Schultes) Steyerl., Mem. New York Bot. Gard. 23: 481. 1972. TYPE: Colombia. Quindiu, *Humboldt & Bonpland s.n.* (holotype, B—Willdenow 4092, photo F neg. 550).

*Psychotria oligotricha* A. P. de Candolle, Prodr. 4: 514. 1830. *Uragoga oligotricha* (DC.) Kuntze, Revis. Gen. Pl. 2: 961. 1891. TYPE: Insular Caribbean. 1822 (fl), *Balbis s.n.* (holotype, G, n.v., photo, F neg. 33534).

*Psychotria chimarrhoides* A. P. de Candolle, Prodr. 4: 514. 1830. TYPE: Cuba. 1829 (fl), *Sagra 289* (holotype, G, n.v., photo, F neg. 33535).

*Psychotria portoricensis* A. P. de Candolle, Prodr. 4: 515. 1830. TYPE: Puerto Rico. 1820 (fl), *Bertero s.n.* (holotype, G, n.v., photo, F neg. 33537).

*Psychotria elongata* Bentham in Oersted, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1852: 32. 1853. TYPE: Nicaragua. Granada: Volcán Mombacho, June 1846 (early fr), *Oersted 11594* (holotype, C, n.v., photo, F neg. 22829, photo & fragment, US).

*Psychotria quiniifolia* Dwyer, Ann. Missouri Bot. Gard. 53: 108. 1966. TYPE: Panama. Bocas del Toro: Almirante, Changuinola Canal, (fl), *Blum 1402* (holotype, MO).

*Shrub* 0.5–2(–3) m tall; young stems ferruginous-tomentose to sometimes glabrous, the bark smooth; stipules sheathing, rounded-ovate, sometimes short-acuminate, 6–11 × 3–6 mm, ferruginous-pubescent to glabrous, caducous, leaving a pale ridge with red-brown fringe. *Leaves* petiolate; petioles 0.3–1.2(–2.5) cm long, ferruginous-pubescent to glabrous, grooved above; blades membranous, oblanceolate to rarely elliptic, the apex long-acuminate, the base attenuate, (6–)11–17(–18) × (2–)4–6.5(–7.5) cm, sparsely tomentose to sometimes glabrous above and below, usually denser below, the midvein usually ferruginous-pubescent, the margin often red-brown ciliate,

drying pale red-brown to green-brown, the veins usually drying reddish; secondary veins (10–)12–17 pairs, diverging 55°–65°, eucamptodromous to brochidodromous, increasingly arcuate toward margin, elevated below, sparsely ferruginous-pubescent, the axils lacking domatia or hairs or rarely with fascicles of several red-brown hairs; tertiary veins inconspicuous to evident, orthogonal reticulate to percurrent. *Inflorescences* terminal or pseudoaxillary, panicles of cymes, the cymes often contracted; panicle branched to 3 degrees; main axis 1–4(–5) cm long, the peduncle lacking; secondary axes in 3(4) ranks, the first-rank axes 2(4), equal, 0.8–2.5(–4) cm long, the second-rank axes (1)2(3), equal, 0.6–1.5 cm long, the third-rank axes 2, equal, 0.2–0.7 cm long, the fourth-rank axes 2, equal, 0.2 cm long; cymes branched to 2–3 degrees; bracts and bracteoles triangular, inconspicuous, to 0.5 mm long, ferruginous-pubescent. *Flowers* sessile to subpedicellate, the pedicels to 0.5 mm long; calyx cup-shaped, the tube 0.3–0.5 mm long, the lobes 5, triangular to not evident, to 0.2 mm long, puberulent; corolla white, the tube cylindrical, 2–3 × 1 mm, white pubescent in throat, often puberulent without, the lobes 5, lanceolate, 1.5 × 0.8 mm; stamens 5, the filaments 1.5–2.5 mm long in pins, 3.5–5 mm long in thrums, the anthers 0.7–1 mm long; style 4–5 mm long in pins, 2–2.5 mm long in thrums, the branches short, clublike. *Fruit* narrow ellipsoid, 5.5–7 mm long, 2.5–3 mm diam., maturing red, drying red-brown, usually red-brown puberulent; persistent calyx inconspicuous or a minute beak; seed dorsal surface with 4–5 longitudinal furrows, the ventral surface with 2 sometimes incompletely divided longitudinal furrows.

*Distribution* (Fig. 27). Ubiquitous, from southern Mexico and the Yucatán peninsula through Panama, most common on the Caribbean coast, at 0–1,200 m elevation in tropical moist to premontane moist to sometimes tropical dry forest with equatorial to tropical (usually equatorial-tropical) climate. It occurs also in Florida, the Bahamas, throughout the Greater and Lesser Antilles, Colombia, and Venezuela. It has been collected in flower throughout the year, primarily February–June in Mexico–Costa Rica and throughout the year in Panama, and in fruit throughout the year.

*Selected specimens examined.* MEXICO. CAMPECHE: 28 km al N de Escárcega, rumbo a Champotón, 7 Mar. 1982 (fl), *Cabrera et al. 2037* (MEXU); Campo Experimental Forestal Tropical “El Tormento,” km 5 carr. Escárcega a Candelaria, 4 Jan. 1966 (st), *Chavelas et al. ES-1247* (MEXU); Tuxpeña, 23 Feb. 1932 (fl), *Lundell 1373* (F, US). CHIAPAS: a lo largo de las cascadas



de Agua Azul, a 60 km al N de Palenque, 3 Mar. 1982 (fr), *Cabrera et al. 1875* (ENCB, MEXU); along Hwy. 199 at Chital, 9 mi. SW of Ocosingo, 1,190 m, 7 July 1977 (fl), *Croat 40371* (MO); 17 km SE of Palenque on road to Bonampak, ejido León Brindis, 300 m, 12 May 1982 (fl), *Davidse et al. 20385* (MO); Mpio. de Ocosingo, Centro Arqueológico Bonampak, 350 m, 24 Dec. 1981 (fr), *Meave et al. B-128* (MEXU). QUINTANA ROO: 1 km NW of Puerto Morelos, Campo Agropecuario del Centro de Investigaciones de Quintana Roo, 5 m, 4 May 1982 (fl), *Davidse et al. 20033* (MO); 5 km al W de Vigia Chico, 13 June 1983 (fl), *Durán & Olmsted 126* (MEXU); Isla de Cozumel, 24 May 1977 (fr), *L. A. Pérez J. & Ramos 1620* (ENCB, MEXU); 1 km al N de Playa del Carmen, 9 Mar. 1980 (fl), *Tellez & Cabrera 1807* (MEXU). TABASCO: Balancán, San Isidro, 7–11 June 1939 (fl), *Matuda 3366* (F, GH, K, MEXU, MO, NY). VERACRUZ: Mpio. Minatitlán, 6.9 km al N de la terracería La Laguna-Río Grande, una depresión kárstica, 120 m, 12 July 1980 (fl), *Wendt et al. 2534* (ENCB, MEXU). YUCATÁN: Chichen Itza, 28 June 1929 (fl), *Bequaert 101* (F, GH); Izamal, (fl), *Gaumer 974* (A, F—2 sheets, GH, US). GUATEMALA. ALTA VERAPAZ: Semococh, 17 km from Sebol, on Cobán Road, 17 May 1964 (fr), *Contreras 4708a* (F); SW of Languín, vic. caves, 600–1,000 m, 21 Feb. 1942 (st), *Steyermark 44127* (F, GH); 1.5–2 mi. S of Cubilgüitz, 300–350 m, 1 Mar. 1942 (fr), *Steyermark 44433* (F). ESCUINTLA: 8 km S of Palín, 8 July 1970 (early fr), *Harmon & Dwyer 2960* (MO); between Río Jute and Río Pantaleón, on rd. between Escuintla and Santa Lucía Cotz, 540–720 m, 24 Jan. 1939 (fr), *Standley 63602* (F, NY). IZABAL: between Bananera and “La Presa” in Montaña del Mico, 40–300 m, 28 Mar. 1940 (fl), *Steyermark 38056* (F). PETÉN: La Libertad and vicinity, 15 May 1934 (fl), *M. Aguilar H. 292* (F, GH, MO); Tikal, on top of Temple V, 11 June 1960 (fl), *Contreras 1077* (DUKE, F, NY); 8 July 1959 (fr), *Lundell 16253* (F, LL, NY); Dolores, bordering Arroyo Ixcol, 14 Apr. 1961 (fl), *Contreras 2070* (DUKE, LL, NY); La Cumbre, km 139–140 of Cadenas Rd., in swamp, 20 Sep. 1966 (fr), *Contreras 6159* (DUKE); nr. archaeological camp on N shore of Lake Yaxja, 150 m, 18 June 1973 (fl), *Croat 24668* (GH, MO, NY); bordeando Lago Petén Itzá, en San Miguel, 21 Jan. 1969 (fl), *Ortíz 124* (ENCB, F, MO, NY); San Luis, en orillando el camino para Poptún, a km 116, 6 Dec. 1970 (fr), *Ortíz 1482* (DUKE, F, MO); Santa Elena, en la orilla del camino para San Francisco, a km 14, 28 June 1971 (early fr), *Ortíz 1859* (ENCB, F, MO, NY); sitio arqueológico en el camino que conduce a cienaga “La Juventud,” km 8.5 E de la aldea Uaxactún, 26 May 1973 (early fr), *Ortíz 2657* (F, MO, NY, US). SACATEPÉQUEZ: nr. Las Lajas, ca. 1,200 m, 28 Nov. 1938 (fl), *Standley 58081* (F). BELIZE. BELIZE: along Northern Hwy., vic. Maskall River, 6 June 1973 (early fr), *Croat 23930* (MO); Sibun River 1.5 km in from mi. 34.5 on Western Highway, 5 July 1973 (early fr), *Dwyer 11491* (DUKE, MO); Big Fall, 21 Mar. 1933 (fl), *Lundell 4159* (F, MEXU); forest nr. Manatee Lagoon, 25 Mar. 1906 (fl), *Peck 385* (GH, K). CAYO: El Cayo, river bluffs, 13 Feb. 1931 (fl), *Bartlett 11435* (F, K, US); bordering Río Mopan, Sucotz, 14 Oct. 1967 (fr), *Contreras 7128* (MEXU, NY). COROZAL: Corozal-Consejo road, Aug. 1933 (fr), *Gentle 4862* (A, GH, MO, NY). ORANGE WALK: Indian Church, Sawmill Rd., 12 May 1977 (fl), *Arnason & Lambert 17293* (MO); nr. Honey Camp, 1930 (fr), *Meyer 98* (F). STANN CREEK: Sittee River, secondary forest, 5 m, 11 Sep. 1930 (fr),

*Schipp 644* (A, F, GH, K, MO, NY). TOLEDO: Columbia Forest Station, 24 June 1972 (fr), *Dwyer 9843* (MO, US); Punta Gorda, 1 Aug. 1980 (fr), *Dwyer 15166* (MO); Nicolas Cay, 5 July 1972 (early fr), *Spellman & Stoddart 2341* (MO). HONDURAS. ATLANTIDA: nr. La Ceiba, 0 m, 11 Mar. 1928 (fl), *Standley 56733* (A, F, US); nr. Tela, sandy soil nr. beach, 20 July 1934 (fl, early fr), *Yuncker 4664* (A, F). COLÓN: N bank of Río Guaimoreto between old bridge and opening of Laguna Guaimoreto, 7.5 km NE of Trujillo, 15°57'N, 85°54'W, 20 Feb. 1981 (fl), *Saunders 1039* (MO). COMAYAGUA: Esquias, 75 km NE of Comayagua, 550 m, 28 Dec. 1981 (fr), *A. Hernández O. 132* (TEFH); colinas rocosas de los alrededores de La Libertad, 400 m, 21 May 1956 (fl), *A. Molina R. 7068* (F, GH, US); villa de Taulabé, qda. La Caliche, 600 m, 21 Apr. 1978 (fl), *Trochez 41* (MEXU, MO). DISTRITO CENTRAL: Tegucigalpa, Mont. de la Flor, 950 m, Dec. 1937 (st), *Hagen & Hagen 1194* (F, NY). EL PARAISO: matorrales de la Qda. El Coyol entre El Junquillo y El Robledal, 1,300 m, 12 June 1964 (fl), *A. Molina R. 14185* (F, NY). FRANCISCO MORAZÁN: 5 km O de Cedros, pinares, orillas de riachuelo Chimbo, 900–1,000 m, 28–30 May 1976 (fl), *C. Nelson & Vargas 3456* (TEFH). GRACIAS A DIOS: nr. Wampusilpi, nr. Río Patuca, 30 Aug.–2 Sep. 1973 (fr), *Clewell 4554* (MO, TEFH); Cocobila, coastal thicket, 0 m, 9 Feb. 1981 (fl), *Proctor 38954* (TEFH). ISLAS DE LA BAHIA: Isla de Roatan, Aug. 1886 (fl), *Gaumer 127* (US). ISLAS DEL CISNE: larger island, 14 Apr. 1913 (st), *G. Nelson 12* (GH, US—2 sheets). OLANCHO: vaguada del río de la población de Culmí, 500 m, 17–22 July 1978 (fr), *C. Nelson & Romero 4640* (MO). YORO: Santa Rita, orillas del Río Humuya, 23 Apr. 1971 (fl), *Mancías & J. Hernández 1138* (MO, TEFH); Aguan River valley, vic. Coyoles, 300 m, June–Aug. 1938 (early fr), *Yuncker et al. 8173* (F, GH, K, MO, NY, US). NICARAGUA. BOACO: NE de Mombachito, 11 May 1982 (fl), *Sandino 2837* (MO). CHONTALES: 2 km al N de Santo Tomas, carret. a Santo Domingo, 12°04'N, 85°06'W, 340–380 m, 30 Apr. 1982 (fl), *P. P. Moreno 16224* (MO); E of El Narajal, between Juigalpa and La Libertad, ca. 12°11'N, 85°15'W, 500 m, 6 Aug. 1983 (fl, early fr), *W. D. Stevens 22435* (MO). JINOTEGA: Salto Kayaska, Río Bocay, 13°51'N, 85°22'W, 190–340 m, 7 Mar. 1980 (fl), *W. D. Stevens et al. 16569* (MO). MATAGALPA: entre las fincas La Castilla y Sta. Basilia, bordeando las márgenes del Río Yasica, 13°01'N, 85°46'W, 400 m, 19 Jan. 1982 (fr), *D. Castro 2264* (MO); Mt. Yasica, 26 km S of Matagalpa, rd. to El Tuma, 400 m, 10 Mar. 1967 (fl), *A. Molina R. 20466* (F, NY, US). RÍO SAN JUAN: San Miguelito, drenaje del Lago Granada, 30 m, 13 Nov. 1951 (fr), *Shank & Molina 4564* (F, GH). RIVAS: Isla Ometepe, faldas del Volcán Maderas al S de la Hda. Magdalena, 11°27'N, 85°30'W, 300–900 m, 28 Nov. 1982 (fl), *P. P. Moreno 18846* (MO); Isla de Ometepe, N de Volcán Concepción, entrada a Los Angeles, 11°33'N, 85°37'W, 480 m, 10 Mar. 1981 (fl), *Sandino 483* (MO). ZELAYA: Puerto Isabel, nr. seabeach, 4 Jan. 1970 (fl), *Atwood & Seymour 2990* (MO—3 sheets); 1.5 km al NW de Monkey Point, 11°36'N, 83°38'W, 1–5 m, 21 Oct. 1981 (fl), *P. P. Moreno & Sandino 12008* (MO); Cerro Kana Coperna, 30 km E of Siuna, 250 m, 17 June 1978 (fl), *Neill 4520* (MO); Cerro Waylawás, summit of northern range, 13°39'N, 84°49'W, 260–268 m, 12 Mar. 1979 (fr), *Pipoly 4507* (MO); El Falso Bluff a E de El Bluff, 11°59'N, 83°41'W, 30 m, 2 Feb. 1982 (fl), *Sandino 2180* (MO); costa N de Puerto Cabezas, 14°02'N, 83°22'W, 12 m, 5 Feb.



1983 (early fr), *Sandino* 3959 (MO); vic. Waní, including Río Ulí, 13°42'N, 84°51'W, 90–110 m, 22 Apr. 1978 (fl), *W. D. Stevens* 7978 (MO). COSTA RICA. CARTAGO: Río Reventazón, entre Florencia y Turrialba, 500–600 m, 10 July 1965 (fl), *A. Jiménez M.* 3269 (CR—2 sheets, F—2 sheets). GUANACASTE: between Liberia and Bagaces, nr. Río Potrero along Interamerican Hwy., 10°33'N, 85°23'W, 80 m, 29 Dec. 1966 (fl), *Burger & Ramírez* 4124 (CR, DUKE, F, MO); Sta. Rosa National Park, 10°51'N, 85°37'W, 200–300 m, 22 Jan. 1978 (fl, fr), *Liesner* 4342 (CR, MO); 23 June 1977 (fl, fr), *Liesner & Lockwood* 2409 (CR, MO); 13–16 km N of Liberia along Camino Sta. María, 600–700 m, 9 July 1976 (fl), *J. Utley & K. Utley* 5394 (CR, DUKE); ca. 5 km S of La Cruz, 260 m, 10 June 1967 (fl), *Weston* 5017 (CR, DUKE, MO, NY). LIMÓN: between Hone Creek and Cahuita, 5 May 1983 (early fr), *L. D. Gómez et al.* 20521 (MO—2 sheets). PANAMA. BOCAS DEL TORO: vic. Almirante, Jan.–Mar. 1928 (fl, fr), *Cooper* 557 (F, NY, US); Bar Mouth, Changuinola Valley, 9 Mar. 1924 (fl, fr), *Dunlap* 538 (US). CANAL AREA: nr. beach at Fort Kobbe, 12 Oct. 1961 (fr), *Duke* 4728 (GH, MO); Madden Dam, Boy Scout Rd., 23 July 1968 (fl, fr), *Dwyer & Lallathin* 8813 (F, GH, MO, NY); forest nr. Curundu, 8°58'N, 79°33'W, 0 m, 10 Mar. 1983 (early fr), *Hamilton & Gentry* 3272 (MO); Fort Sherman and nearby, 9°20'N, 80°00'W, 0–100 m, 16 June 1983 (fl), *Hamilton & Stockwell* 3696 (MO); 6 km E of Gamboa, 160–190 m, 24 Dec. 1973 (fl), *Nee* 8993 (F, MO). COCLÉ: Penonomé, 14 July 1962 (fl), *Dwyer* 2007 (MO); W of Río Guías, 10 Sep. 1972 (fr), *Gentry* 5847 (F, MO); El Espino de Antón–Río Arenales, 7 Oct. 1973 (fr), *E. Jaén* 17 (DUKE); between Las Margaritas and El Valle, 15 July–8 Aug. 1938 (fl, fr), *Woodson et al.* 1745 (F, GH, MO, NY). COLÓN: Isla Grande, 11 Apr. 1970 (fr), *D'Arcy* 4036b (MO); coastline between Garrote and La Guaira, 4 Nov. 1975 (fr), *D'Arcy* 9364 (MO, NY); beach between Fató and Playa de Damas, 8–10 July 1911 (fr), *Pittier* 3936 (NY, US); vic. Sta. Isabel, 12–14 Aug. 1911 (fl, fr), *Pittier* 4181 (NY, US). DARIÉN: vic. Yaviza, along Río Chucunaque, above El Punteadero, 7 June 1959 (fl), *Stern et al.* 145 (GH, MO, US). PANAMÁ: San Carlos (Corona), 21 Oct. 1972 (fr), *Buitrago* 1 (DUKE, MO); rd. between Panama and Chepo, 29 Nov. 1934 (fr), *Dodge et al.* 16637 (GH, MO, NY); Isla de Pedro Gonzales, Perlas, 21 Aug. 1961 (fl), *Dwyer* 1725 (MO); vic. Goofy Lake, 26 Nov. 1966 (fl, fr), *Dwyer* 7128 (GH, MO, US); San José Island, Pearl archipelago, 15 July 1945 (fl), *Erlanson* 475 (GH, NY, US); 12 Oct. 1944 (fr), *I. Johnston* 142 (GH, MO, US); Majé, along bank of Río Majé, 18 Nov. 1970 (fl, fr), *Foster & Kennedy* 2017 (DUKE, F, MO); 3.4 mi. E of Cañasas, 8°52'N, 78°15'W, ca. 100 m, 12 Sep. 1981 (early fr), *Knapp* 1185 (ENCB, MO); Río Tocumen, 3 Jan. 1924 (fl), *Standley* 29433 (US). SAN BLAS: mainland in front of Ustupo, 9 Nov. 1975 (fl, fr), *D'Arcy* 9524 (MO, NY); Soskatupu, island 1.5 × 0.5–0.7 mi., 0–45 m, 15 Aug. 1967 (fl, early fr), *Elias* 1691 (GH, MEXU, MO, US); nr. Puerto Obaldía, 8°40'N, 77°25'W, 0 m, 16 Apr. 1982 (fl, fr), *Knapp & Mallet* 4649 (MO).

All the species in synonymy have been properly synonymized before, with the exception of *P. quinifolia*, the morphology of which does not differ from that of *P. nervosa*. Degree of pubescence varies within populations, and infraspecific taxon-

omy based on this character (e.g., subsp. *rufescens*) is not recognized.

*Psychotria nervosa* may be recognized by its usually reddish pubescent aspect, leaves with usually eucamptodromous secondary veins diverging 55°–65°, small (1–4(–5) cm long) inflorescences lacking peduncles and with secondary axes usually 2 per rank in usually 3 ranks, and narrow-ellipsoidal fruit (5.5–7 × 2.5–3 mm). There appears to be no geographic component to the variation between glabrous and densely tomentose aspect. Collections from Florida are noteworthy for small leaves and relatively large inflorescences.

#### GROUP 6. THE PANAMENSIS GROUP

Shrub or tree; young stems glabrous or (often red-brown) puberulent; stipules usually sheathing, lanceolate (Fig. 2d) or ovate, or less commonly linear or triangular with the apex sometimes bilobed or biacuminate, uniform in color, glabrous or fringed or puberulent, caducous. Leaf blades usually elliptic, or sometimes obovate, ovate, or lanceolate, drying green-brown to red-brown to brown, sometimes paler below; secondary veins (4–)6–19(–22) pairs, diverging (30°–)45°–75°(–80°), eucamptodromous to brochidodromous, the axils sometimes with domatia (sometimes *P. cocosensis* and *P. lundellii*) or with tufts of hair (sometimes *P. chiriquina*, *P. lundellii*, and *P. mexiae*) or usually lacking; tertiary veins orthogonal reticulate to percurrent. Inflorescences panicles of cymes (or of glomerules sometimes in *P. panamensis* or of individual flowers in *P. hornitensis*), nonpedunculate (Fig. 7e) except in *P. olgae*, *P. stockwellii*, and sometimes in *P. cascajalensis*, *P. chiriquina*, *P. dwyeri*, *P. lundellii*, *P. panamensis*, *P. sara-piquensis*, and *P. trichotoma*; secondary axes usually in 1 pair per rank or less commonly 2 equal pairs or 2 size-differentiated pairs per rank, diverging acutely except in *P. stockwellii*; bracts not conspicuously enlarged, to 3 mm long only in *P. chiriquina*. Corolla tubes (1.5–)2–5 mm long, the lobes without apical extensions. Fruit ellipsoid, obovoid, or spherical when dry; persistent calyx a beak or less commonly a conspicuous tube (*P. cocosensis* [Fig. 9c] and *P. olgae* and sometimes *P. panamensis*) or often not evident; seed dorsal surface with (3–)4–10 often irregular longitudinal furrows, the ventral surface with 2 deep plus often several irregular longitudinal furrows (Figs. 10g, 10h).

Half of the 12 species of the group are assigned to the *Psychotria panamensis* complex; *P. pana-*



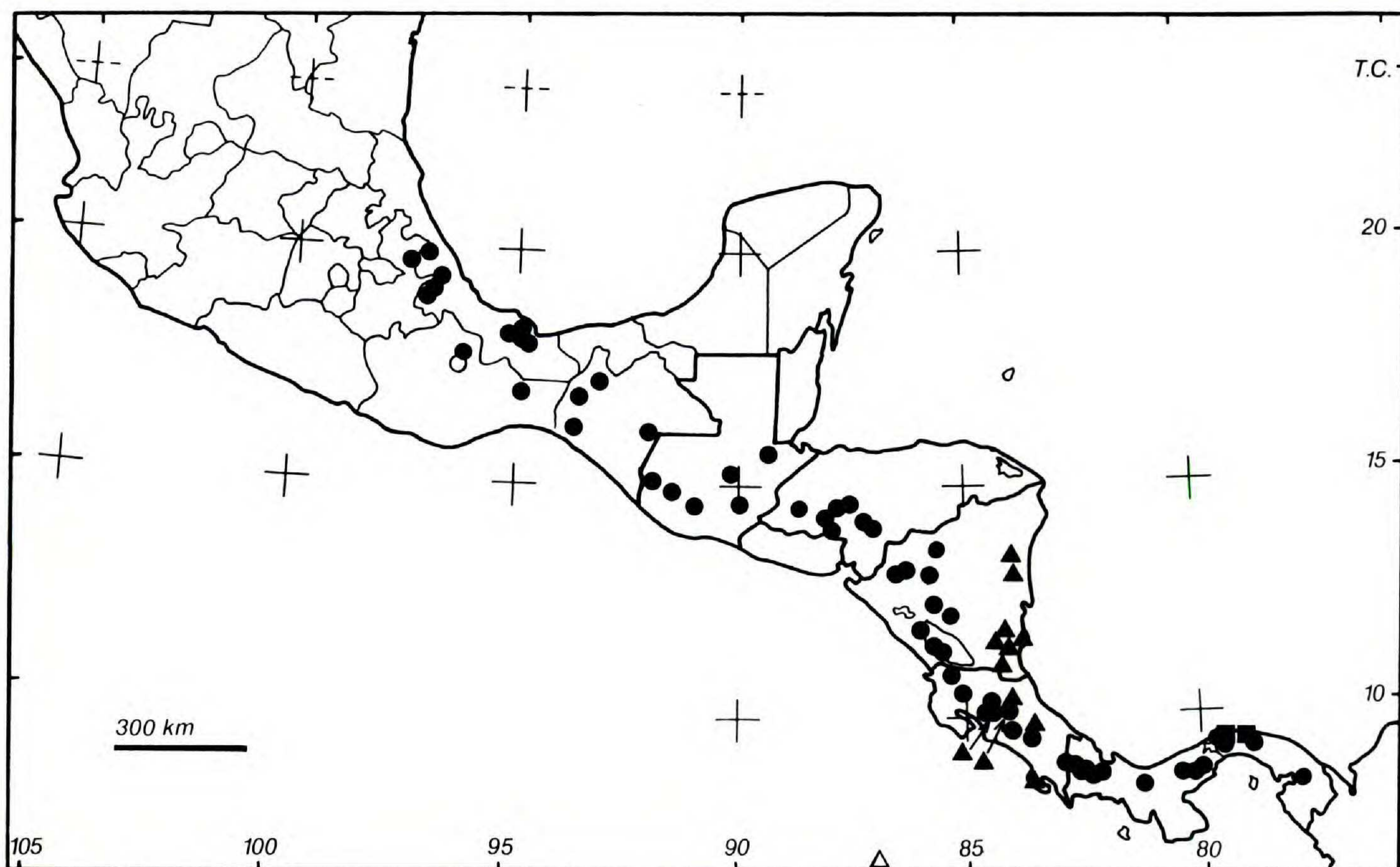


FIGURE 28. Distributions of *Psychotria cocosensis* (open triangle), *P. panamensis* var. *compressicaulis* (solid triangles), *P. panamensis* var. *ixtlanensis* (open circle), *P. panamensis* var. *magna* (solid squares), and *P. panamensis* var. *panamensis* (solid circles) in Mesoamerica.

*mentis* is widespread (Fig. 28), the other five much less so: *P. cascajalensis* (Coclé, Panama; Fig. 29), *P. cocosensis* (Cocos Island, Costa Rica; Fig. 28), *P. dwyeri* (southern Mexico; Fig. 29), *P. olgae* (eastern Panamá Province; Fig. 29), and *P. stockwellii* (Costa Rica and Panama; Fig. 30). Three other widespread species have character states that distinguish them from typical members of the group and are of uncertain affinities, although analysis might reveal they belong in the *panamensis* complex: *P. trichotoma* has obovoid fruits and conspicuously brochidodromous venation; *P. sarapiquensis* has usually narrowly oblanceolate leaves; and *P. mexiae* has 5–8 deep irregular furrows on the seed dorsal surface. The most cohesive complex is that of *P. chiriquina*, which includes that species (Nicaragua through Panama; Fig. 29), *P. lundellii* (Chiapas through El Salvador; Fig. 29), and *P. hornitensis* (western Panama; Fig. 30); they share ovate stipules and shallow furrows on the seed ventral surface.

Of the 15 taxa in the group, eight appear distylous; of those, *Psychotria dwyeri*, *P. mexiae*, *P. olgae*, *P. stockwellii*, and *P. trichotoma* show some between-morph asymmetry in floral part lengths. *Psychotria lundellii* appears to be pin-monomorphic in Belize, but recently I examined a thrum collection from Guatemala. *Psychotria*

*panamensis* var. *compressicaulis*, on the other hand, is thrum-monomorphic. *Psychotria cocosensis* and *P. hornitensis* are long-homostylous. *Psychotria cascajalensis*, *P. panamensis* var. *ixtlanensis*, and *P. panamensis* var. *magna* do not have sufficient flowering material for analysis.

**36. *Psychotria cascajalensis*** C. Hamilton, *Phytologia* 64: 220. 1988. TYPE: Panama. Coclé: N of Penonomé, between Llano Grande and Cascajal, rd. to Coclesito, 480 m, 2 May 1979 (fl), *Hammel* 7227 (holotype, MO-2901097; isotypes, ENCB, MO). Figure 29.

*Tree* 10 m tall; young stems glabrous to sparsely puberulent, the bark smooth; stipules oval, rounded, 6–7 × 3–3.5 mm, fringed, glabrous, caducous, leaving a pale ridge with red-brown fringe. *Leaves* petiolate; petioles 2–4 mm long, glabrous, flat above; blades coriaceous, elliptic, the apex acute, the base attenuate, 3.5–6(–7) × (1.5–)2–2.7 cm, glabrous above and below, drying dull red-brown to green-brown; secondary veins 4–6 pairs, diverging 55°–65°, brochidodromous with secondary loops inconspicuous, straight then arcuate near margin, not elevated below, glabrous, the axils lacking domatia or hairs; tertiary veins inconspicuous. *Inflorescences* terminal, panicles of cymes or glomerules;



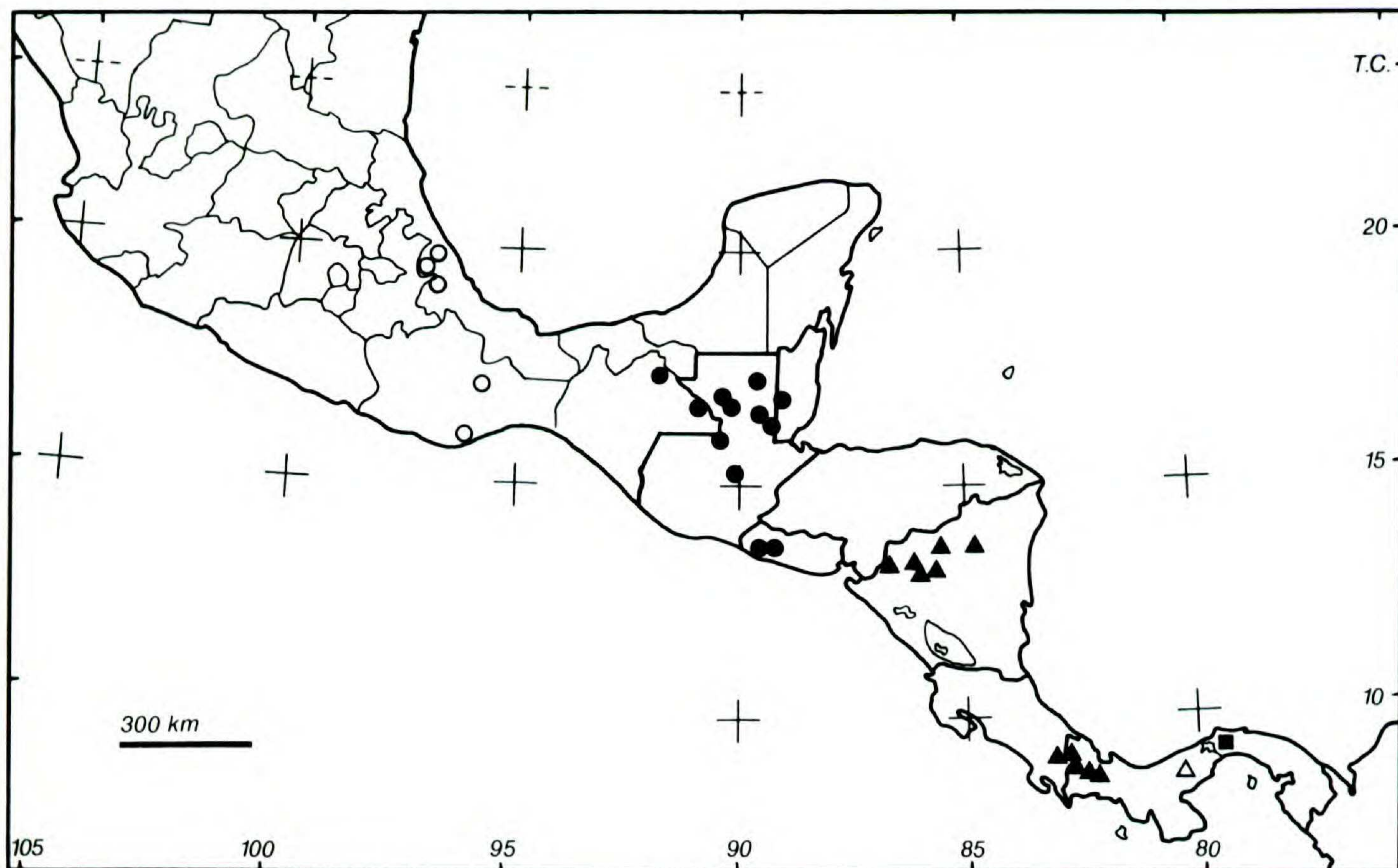


FIGURE 29. Distributions of *Psychotria cascajalensis* (open triangle), *P. chiriquina* (solid triangles), *P. dwyeri* (open circles), *P. lundellii* (solid circles), and *P. olgae* (solid square).

panicle branched to 3 degrees; main axis 6 cm long, the peduncle 2–3.5 cm long; secondary axes in 3 ranks, the first-rank axes 2 or 4, the longer pair 1–2 cm long, the shorter pair 0.4–1.2 cm long when present, the second-rank axes 2, 0.5–0.8 cm long, the third-rank axes 2, 0.1–0.3 cm long; cymes branched to 1–2 degrees; bracts and bracteoles broadly triangular, 1–2 mm long, red-brown pubescent. *Flowers* sessile, the pedicels 0.5 mm long; calyx cup-shaped, the tube 0.8 mm long, the lobes 5, triangular to barely evident, to 0.3 × 0.8 mm, puberulent, fringed; corolla green-white, the tube cylindrical, 1.5 × 1.5 mm, thickly white pubescent in throat, the lobes 5, triangular, 1.5 × 1 mm; stamens 5, the filaments not seen in pins, 1.5 mm long in thrums, the anthers 1 mm long; style not seen in pins, 1 mm long in thrums, the branches linear. *Fruit* not seen.

*Distribution* (Fig. 29). Known only from the type collection from the foothills south of the divide in Coclé, Panama, at 480 m in a region of tropical moist to premontane wet forest with equatorial-mountainous climate. It was collected in flower on May 2.

*Psychotria cascajalensis* may be recognized by its small (usually 3.5–6 × 2–2.7 cm), coriaceous, elliptic leaves and robust pedunculate inflorescences with secondary axes 2(4) per rank in three ranks.

The only flowering collection appears to be a thrum morph.

**37. *Psychotria chiriquina*** Standley, Contr. U.S. Natl. Herb. 18: 129. 1916. TYPE: Panama. Chiriquí: Alto de la Cuesta, E slope of Chiriquí Volcano, 2,100–2,200 m, 10–13 Mar. 1911 (fl), *Pittier 3118* (holotype, US). Figure 29.

*Shrub* or small tree, 1–6 m tall; young stems glabrous, the bark gray, deeply fissured longitudinally; stipules sheathing, ovate, sometimes bilobed, 8–10 × 3–5 mm, glabrous to red-brown puberulent, fringed, caducous, leaving a pale ridge with red-brown fringe. *Leaves* petiolate; petioles 0.6–1.5 cm long, glabrous to red-brown puberulent, flat above; blades membranous, elliptic, the apex long-acuminate, the base attenuate, (4–)6.5–9(–12) × (1–)1.5–2.5(–3) cm, glabrous above and below, drying deep red-brown; secondary veins 5–11(–12) pairs, diverging 30°–65°, eucamptodromous, constantly arcuate, prominulous to not elevated below, glabrous, the axils with or without minute tufts of hair; tertiary veins evident to inconspicuous, orthogonal reticulate to percurrent. *Inflorescences* terminal, panicles of cymes; panicle branched to 2–4 degrees; main axis (1–)2–7 cm long, the peduncle lacking or 1–4.5 cm long; secondary axes in 3(4) ranks, the first-rank axes



2, (0.4–)1–3.2 cm long, the second-rank axes 2, (0.3–)0.5–1.4 cm long, the third-rank axes 2, (0.1–)0.3–0.5 cm long, the fourth-rank axes 2, 0.2 cm long; cymes branched to 1–2 degrees; bracts linear, 2–3 mm long, glabrous to ciliate; bracteoles irregular, to 0.8 mm long, sparsely ciliate. *Flowers* sessile to pedicellate, the pedicels to 3 mm long; calyx cup-shaped, the tube 1 mm long, the lobes 5, triangular to barely evident, 0–0.6 × 0.8 mm, glabrous to minute-puberulent; corolla white, the tube cylindrical, 4–6 × 1.5–2 mm, white pubescent in throat, the lobes 5, linear, 1.5–2 × 1 mm; stamens 5, the filaments 4–4.5 mm long in pins, 5.5–6 mm long in thrums, the anthers 1 mm long; style 6 mm long in pins, 4–5 mm long in thrums, the branches minute, clublike. *Fruit* when dry ellipsoid, 5–6 mm long, 4–4.5 mm diam., maturing red, drying deep red-brown; persistent calyx a minute beak to 1 mm long; seed dorsal surface with 4 shallow longitudinal furrows, the ventral surface with 2 shallow longitudinal furrows.

*Distribution* (Fig. 29). Known from northern Nicaragua and from both sides of the Costa Rica–Panama border at elevations of 900 to 2,500 m in premontane to lower montane moist forest to rainforest with equatorial-mountainous to tropical-mountainous climate. *Psychotria chiriquina* has been collected in flower July–August in Nicaragua and primarily February–May in Costa Rica and Panama, and in fruit November–May in Nicaragua and August–April in Costa Rica and Panama.

*Selected specimens examined.* NICARAGUA. JINOTEGA: carret. Matagalpa–Jinotega, km 133–134, a 10 km al SE de Jinotega, 13°01'N, 85°55'W, 1,400–1,480 m, 24 Feb. 1979 (fr), *Grijalva & Araquistain 175* (MO); Montaña Cuspire, 13°17'N, 86°09'W, 1,500–1,539 m, 10 Apr. 1981 (fr), *P. P. Moreno 8036* (MO); NE del Cerro Kilambé, “Filas el Portal,” 13°37'N, 85°40'W, 600–900 m, 26 Mar. 1981 (fr), *P. P. Moreno & Sandino 7583* (MO). MADRIZ: Cerro Pataste, 1,600 m, 8 May 1975 (fr), *Neill 129* (MO). MATAGALPA: Cerro El Picacho, N del hotel Selva Negra, 13°00'N, 85°55'W, 1,500 m, 7 July 1983 (fl), *P. P. Moreno 21678* (MO); Hda. Santa María de Ostuma, 10 km N of Matagalpa, 1,500 m, 12 Aug. 1977 (fl), *Neill 2304* (MO); Macizos de Peñas Blancas, SE side, drainage of Qda. El Quebradon, slopes N and W of Hda. San Martín, 13°15'N, 85°38'W, 1,000–1,400 m, 18–20 Jan. 1982 (fr), *W. D. Stevens et al. 21145b* (MO); Sta. María de Ostuma, Cordillera Central between Matagalpa and Jinotega, 1,300–1,500 m, 8–15 Jan. 1963 (fr), *L. O. Williams et al. 23342* (F, GH, NY, US). RIVAS: Isla Ometepe, faldas del Volcán Maderas al S de la Hda. Magdalena, 11°27'N, 85°30'W, 300–900 m, 28 Nov. 1982 (fr), *P. P. Moreno 18854* (MO). ZELAYA: Cerro La Pimienta, N slope facing La Garrapata, 13°45'N, 84°59'W, 900–1,180 m, 16 Mar. 1980 (fr), *Pipoly 6050* (MO). COSTA RICA. PUNTARENAS: valley of Río Cotón between Sitio Cotón (Cotonsito) and Sitio Tablas, 8°57'N, 82°46'W, 1,500–1,600 m, 2 Sep. 1983 (early fr), *Da-*

*vide 24415* (CR, MO); trail between Tres Colinas and Cerro Bekom, 9°08'N, 83°04'W, 2,300 m, 28 Mar. 1984 (fr), *Davidse & Herrera 26175* (CR, MO); vic. Helechales, along Río Guineal, 9°04'N, 83°05'W, 1,100–1,200 m, 29 Mar. 1984 (fl), *Davidse & Herrera 26219* (MO); Cerro Burú, 9°00'N, 82°49'W, 2,000–2,300 m, 20 Aug. 1983 (fr), *Davidse et al. 23825* (MO); upper Río Burú, 2,010 m, 19 Aug. 1983 (fr), *Gómez et al. 21509* (MO). PANAMA. BOCAS DEL TORO: Valle de Silencio, 9°05'N, 82°56'W, 8–10 Aug. 1979 (fr), *Antonio 1586* (MO). CHIRIQUÍ: slopes of Las Cumbres nr. Cerro Punta, 20 Feb. 1971 (fl, fr), *Croat 13737* (F, MO—2 sheets, NY); E slope of Volcán Barú, 10 mi. from Boquete, 2,500 m, 18 May 1976 (fl), *Croat 34982* (MO, NY); Caldera–Chiriquicito trail, 21 Apr. 1968 (fr), *Kirkbride & Duke 1007* (MO); Cerro Hornito, above Los Planes de Hornito, 8°42'N, 82°06'W, 2,100 m, 14 Mar. 1982 (fl), *Knapp et al. 4196* (MO); slopes approachng Cerro Horqueta, 1,500–1,800 m, 5 Jan. 1975 (fl), *Wilbur & Luteyn 19316* (DUKE); E of Guadalupe along Río Chiriquí Viejo ca. 2 mi. NE of Cerro Punta, Cerro Respinga ridge, 13 Jan. 1971 (fl, fr), *Wilbur et al. 13106* (DUKE, MO).

*Psychotria chiriquina* may be recognized by its small (usually 6.5–9 × 1.5–2.5 cm) narrow-elliptic leaves drying deep red-brown, deeply longitudinally fissured bark, long (4–6 mm) corolla tube, and robust (5–6 × 4–4.5 mm) ellipsoid fruits drying deep red-brown. There are several differences noted in collections from Nicaragua as opposed to those from Panama. Nicaraguan material shows fewer (5–7 vs. usually 8–11[–12]) secondary veins and more acute (30°–50° versus 55°–65°) angles of divergence of secondaries. Panamanian material shows often pedicellate inflorescences and fruits with a more prominent persistent calyx.

**38. *Psychotria cocosensis*** C. Hamilton, *Phytologia* 64: 222. 1988. TYPE: Costa Rica: Cocos Island, 18 June 1898 (fr), *Pittier 12375* (holotype, US). Figures 9c, 28.

*Shrub*; young stems glabrous, the bark furrowed longitudinally; stipules lanceolate, 12–35 × 2–5 mm, glabrous, caducous, leaving a pale ridge with red-brown fringe. *Leaves* petiolate; petioles 7–14 mm long, glabrous, grooved or flat above; blades subcoriaceous to coriaceous, elliptic, the apex acuminate to subcaudate, the base attenuate, (12–) 14–17 × 5.5–7 cm, glabrous above and below, drying red-brown to green-brown; secondary veins (9–)10–12 pairs, diverging 45°–50°, eucamptodromous to brochidodromous, straight then arcuate near margin, elevated below in less coriaceous leaves, the axils with small domatia below; tertiary veins inconspicuous to evident, percurrent to reticulate. *Inflorescences* terminal, panicles of cymes; panicle branched to 2–3 degrees; main axis 1 cm long, the peduncle lacking; secondary axes in 2 ranks, the first-rank axes 2, 0.6 cm long, the second-rank axes 2, reduced; cymes branched to



1 degree; bracts triangular, 0.7–1.5 mm long, glabrous. *Flowers* pedicellate, the pedicels 2–3 mm long; calyx cup-shaped, the tube 1 mm long, the lobes 5, broadly triangular to barely evident, glabrous; corolla color unknown, the tube cylindrical, 3 × 3 mm, white pubescent in throat, the lobes 5, linear, 4 × 2 mm; stamens 5, the filaments 7 mm long, the anthers 2 mm long; style 9–10 mm long, the branches minute, linear. *Fruit* when dry spherical to ellipsoid, 6 mm long, 5.5–6 mm diam., drying dark red-brown; persistent calyx cuplike, coriaceous, 1.5 mm long (Fig. 9c); seed dorsal surface with 4 shallow, irregular, longitudinal furrows, the ventral surface with 2 deep, irregular, longitudinal furrows.

*Distribution* (Fig. 28). Known only from the type locality, Cocos Island, at 50 m elevation in premontane rainforest. *Psychotria cocosensis* has been collected in fruit in January and June.

*Additional specimens examined.* COSTA RICA. COCOS ISLAND: La vallée de Chatham, 50 m, Jan. 1902 (fl, fr), Pittier 16279 (GH, US).

*Psychotria cocosensis* may be recognized by its close resemblance to *P. panamensis* and by its coriaceous leaves and large (6 × 5.5–6 mm) spherical to ellipsoid fruits with calyx persisting as a coriaceous cup ca. 1.5 mm long.

Style and stamens are both exerted in the one flowering collection seen, suggesting strongly that the species is long-homostylous.

**39. *Psychotria dwyeri*** C. Hamilton, *Phytologia* 64: 223. 1988. TYPE: Mexico. Oaxaca: Dto. Choapan (Santiago Choapan), Sta. María, Montaña Sta. María, 1,500 m, 7 Apr. 1938 (fr), *Mexia* 9265 (holotype, NY; isotypes, B, F, GH, K, MO, US). Figure 29.

*Shrub* or small tree, 3–6 m tall; young stems glabrous, the bark smooth; stipules sheathing, triangular, 8–13 × 3–5 mm, glabrous, caducous, leaving a pale ridge often with red-brown fringe. *Leaves* petiolate; petioles (5–)15–40(–45) mm long, glabrous, furrowed above; blades membranous, elliptic, the apex cuspidate, the base cuneate to attenuate, (12–)15–23 × 5–10 cm, glabrous above, glabrous to minutely white puberulent below, drying green-brown, paler below; secondary veins (12–)15–18 pairs, diverging 55°–70°(–80°), eucamptodromous, straight to slightly arcuate, elevated below, often white puberulent below, the axils lacking domatia or hairs; tertiary veins evident, orthogonal reticulate, the loops near margin evident. *Inflorescences* terminal, panicles of cymes;

panicle branched to 4 degrees; main axis 5.5–10.5 cm long, the peduncle lacking or to 2 cm long; secondary axes in 4–5(–6) ranks, the first-rank axes 2, (2.5–)7–9 cm long, the second-rank axes 2(4), (2–)3–5.5 cm long, the third-rank axes 2, (0.5–)1.5–4 cm long, the fourth-rank axes 2(4), (0.5–)1–2 cm long, the fifth-rank axes 2, 0.6–0.8 cm long, the sixth-rank axes 2, 0.3 cm long; cymes branched 1–2 degrees; bracts inconspicuous. *Flowers* pedicellate, the pedicels 0.5–1.5 mm long; calyx cup-shaped, the tube 0.5 mm long, the lobes 5, broadly triangular, minute, glabrous to minutely fringed; corolla white, the tube cylindrical, 2–2.5 × 2 mm, white pubescent in throat, the lobes 5, triangular, 1.5–2 × 1 mm; stamens 5, the filaments 2–2.5 mm long in pins, 2.5–3 mm long in thrums, the anthers 1 mm long; style 4–4.5 mm long in pins, 1.5–2 mm long in thrums, the branches linear in pins, clublike in thrums. *Fruit* when dry spherical, 4.5–5 mm long, 4.5–5 mm diam., maturing red, drying deep red-brown; calyx persistent as a beak, to 0.8 mm long; seed dorsal surface with 4 irregular longitudinal furrows, the ventral surface with 2 deep longitudinal furrows.

*Distribution* (Fig. 29). Known from Veracruz and Oaxaca, Mexico, at elevations of 50–1,500 m in a region of subevergreen forest with tropical to tropical-mountainous climate. This species has been collected in flower in April and May and in fruit April, June, and December.

*Specimens examined.* MEXICO. OAXACA: Ubero, 30–90 m, June 1937 (fr), *Ll. Williams* 9475 (F). VERACRUZ: San Lorenzo Tenochtitlán, 9 Dec. 1967 (st), *Chavelas et al.* ES-2832 (MEXU); El Mirador, 1853 (fl), *F. Muller* 424 (NY); Apr. 1932 (fl), *Purpus* 14124 (A, F); Zacuapan, 1915 (fl), *Purpus* 7525 (MO, US); May 1926 (fl), *Purpus* 10705 (US); Jalapa, 1,200–1,350 m, 1894 (fl), *C. Smith* 1844 (F, US).

*Psychotria dwyeri* resembles *P. panamensis* in inflorescence and vegetative characters and is distinguished most easily in fruit. *Psychotria dwyeri* has spherical (vs. ellipsoid to obovoid) fruit 4.5–5 mm (vs. 4.5–8 mm) long.

Reproductive organs at both levels appear to be longer in the pin morph than in the thrum.

**40. *Psychotria hornitensis*** Dwyer & C. Hamilton in C. Hamilton, *Phytologia* 64: 225. 1988. TYPE: Panama. Chiriquí: ridge and summit of Cerro Hornito, above Los Planes de Hornito, 8°42'N, 82°06'W, 2,100 m, 14 Mar. 1982 (fl, early fr), *Knapp et al.* 4198 (holotype, MO). Figure 30.

*Shrub* 2 m tall; young stems glabrous, the bark deeply furrowed longitudinally; stipules sheathing,



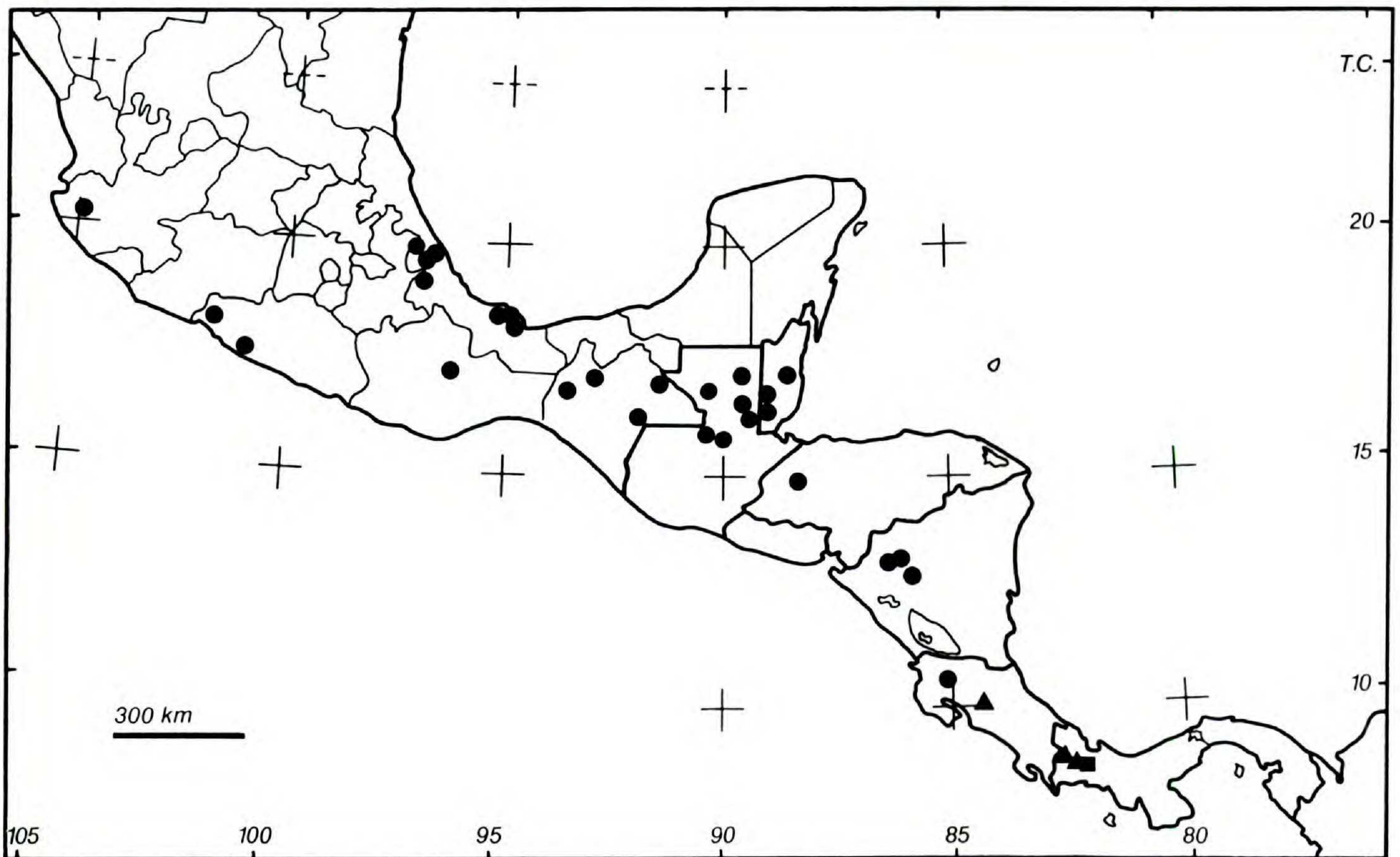


FIGURE 30. Distributions of *Psychotria hornitensis* (square), *P. mexiae* (circles), and *P. stockwellii* (triangles) in Mesoamerica.

ovate to lanceolate, 3–4 × 1–1.5 mm, glabrous, caducous, leaving a pale ridge with red-brown fringe. *Leaves* subsessile; petioles to 2 mm long, glabrous, flat above; blades membranous, narrowly elliptic, the apex long acuminate, the base attenuate, 2.5–3.5 × 0.5–0.7 cm, glabrous above and below, drying dull green-brown above, dull green below; secondary veins 5–6 pairs, diverging ca. 50°, eucamptodromous, constantly arcuate, not evident above, barely evident below, glabrous, the axils lacking domatia or hairs; tertiary veins inconspicuous. *Inflorescences* terminal, panicles of 3–5 individual flowers or cymes; panicle branched to 2 degrees; main axis 2.5–3 cm long, the peduncle 1.5–2 cm long; secondary axes in 1–2 ranks, the first-rank axes 1–2, 0.3–0.4 cm long, the second-rank axes 1–2, 0.1 cm long; cymes branched to 1 degree; bracts and bracteoles linear, 1.5–2 × 0.7 mm, glabrous to puberulent within near base. *Flowers* sessile to pedicellate, the pedicels to 1 mm long; calyx cup-shaped, the tube ca. 1 mm long; the lobes 5, triangular, 0.8–1 × 0.8 mm, glabrous; corolla white, the tube cylindrical, 3.5–4 × 1.5 mm, white pubescent in throat, the lobes 5, ovate, 1–1.5 × 0.8 mm; stamens 5, 3–4 mm long, the anthers 1 mm long; style 4–6 mm long, the branches short, linear. Mature *fruit* not seen.

*Distribution* (Fig. 30). Known only from the type locality, Cerro Hornito, Chiriquí, Panama, at

ca. 2,000 m elevation in low montane rainforest with equatorial-mountainous climate. *Psychotria hornitensis* has been collected in flower in February and March and with immature fruit in March.

*Additional specimen examined.* PANAMA, CHIRIQUÍ: ridge nr. top of Cerro Hornito, 1,950 m, 15 Feb. 1979 (fl), Hammel 6189 (MO).

*Psychotria hornitensis* may be recognized readily by its small, narrow (2.5–3.5 × 0.5–0.7 cm) leaves and small (2.5–3 cm long) few-flowered inflorescences.

The one flower morph found does not show significant differentiation in length between the exerted style and stamens, so the species is presumed to be long-homostylous.

**41. *Psychotria lundellii*** Standley in Lundell, *Contr. Univ. Michigan Herb.* 4: 29. TYPE: Belize. Cayo: Valentin, 26 June 1936 (fl), Lundell 6260 (holotype, F; isotypes, GH, MICH, n.v., NY, US). Figure 29.

*Tree* or shrub, (1–)2–15 m tall; young stems glabrous or red-brown puberulent, the bark pale, cracked and furrowed longitudinally; stipules ovate, rounded, 5–6 × 2–4 mm, glabrous, often ciliate, caducous, leaving a pale ridge with red-brown fringe. *Leaves* petiolate; petioles 0.8–2 cm long, glabrous, grooved above; blades subcoriaceous, elliptic, the



apex acuminate, the base attenuate, (5–)7.5–15 × (1.8–)2.5–5 cm, glabrous above and below, drying pale to glossy red-brown; secondary veins (5–)6–8(–12) pairs, diverging (30°–)60°–65°, brochidodromous, constantly arcuate, prominulous below, glabrous, the axils usually with minute tufts of red-brown hair and/or domatia below; tertiary veins not evident. *Inflorescences* terminal or pseudoaxillary, panicles of cymes; panicle branched to (3)4 degrees; main axis 4–7.5 cm long, the peduncle (0–)1–3 cm long; secondary axes in 4(5) ranks, the first-rank axes 2(4), the longer pair 1.5–3.5 cm long, the shorter pair when present 1.6 cm long, the second-rank axes 2, 0.8–1.7 cm long, the third-rank axes 2, 0.5–0.7 cm long, the fourth-rank axes 2, 0.2–0.3 cm long, the fifth-rank axes 2, 0.2 cm long; cymes branched to 1–2 degrees; bracts sheathing, irregular, to 1.5 mm long, ciliate; bracteoles triangular, 0.3–0.5 mm long, ciliate. *Flowers* pedicellate, the pedicels 0.7–1 mm long; calyx cup-shaped, the tube 0.5 mm long, the lobes 5, triangular, 0.3 × 0.6 mm, minutely ciliate; corolla green-white, the tube campanulate, 2–2.5 × 1.5 mm, white pubescent in throat, the lobes 5, ovate-acuminate, 1.5–2 × 1 mm; stamens 5, the filaments 1.5–2 mm long in pins, 4 mm long in thrums, the anthers 0.7 mm long; style 3–4 mm long in pins, 2 mm long in thrums, the branches linear. *Fruit* spherical when dry, (4–)4.5–5(–5.5) mm long, (4–)4.5–5(–5.5) mm diam., maturing red, drying red-brown; persistent calyx not conspicuous or rarely to 0.3 mm long; seed dorsal surface with 3–6 shallow irregular longitudinal furrows, the ventral surface with 2 deep and often 2–4 additional irregular longitudinal furrows.

*Distribution* (Fig. 29). Eastern Chiapas, Guatemala, western Belize, and El Salvador, at elevations below 500 m except in El Salvador, where this species occurs at 1,800–2,000 m. It is found in evergreen forest with equatorial-tropical or sometimes tropical to tropical-mountainous climate. *Psychotria lundellii* has been collected in flower April–July and in fruit July–April, primarily January–March.

*Selected specimens examined.* MEXICO. CHIAPAS: 23 mi. SE of Palenque, rd. to Chancala, 160 m, 6 July 1977 (fl), *Croat 40294* (MO); Mpio. Ocosingo, 3 km al S del Centro Arqueológico Bonampak, orillas del Río Lacanja, 300 m, 2 Apr. 1982 (fr), *Meave et al. B-407* (MEXU, MO). GUATEMALA. ALTA VERAPAZ: Rubelsanto, between Pozo #4 and Laguneta Los Lagartos, 29 July 1975 (fr), *Lundell & Contreras 19575* (MO). BAJA VERAPAZ: Unión Barrios, 12 Mar. 1972 (fr), *Contreras 11268* (MO); Niño Perdido, Qda. Seca, 31 May 1977 (fl), *Lundell & Contreras 21037* (MO). PETÉN: Uaxactún, 7 Apr. 1931 (fr), *Bartlett 12533* (F, GH, K, NY, US); Tikal National Park,

in ramonal on Temple 27, 16 Mar. 1966 (fr), *Contreras 5609* (ENCB, F, MO, NY); Chinchila, 8 km from San Luis, on Sebol Rd., 10 Oct. 1966 (fr), *Contreras 6357* (MO); 5 km from La Cumbre, bordering Pusila River, 22 Aug. 1969 (fr), *Contreras 9004* (MO); Dolores, lado SE, ca. 100 m del camino, a km 86, 14 Feb. 1971 (fr), *Ortiz 1578* (F, US); en el camino que conduce a sitio arqueológico "Ceibal," a 9 km SE de Sayaxché, 13 June 1973 (fl), *Ortiz 2681* (F). BELIZE. CAYO: Valentin, in advanced forest, limestone valley, June–July 1936 (fl), *Lundell 6194* (F, GH, NY, US); *Lundell 6234* (A, F—2 sheets, MO, NY, US); *Lundell 6249* (A, F—2 sheets, MEXU, MO, NY). EL SALVADOR. SAN SALVADOR: Volcán San Salvador, forest El Picacho NE of El Boquerón, 1,950 m, 1 Mar. 1968 (fr), *A. Molina R. & Montalva 21831* (F, NY). SONSONATE: Sierra Apaneca, cut-over forest, Cerro El Pilón, 1,800 m, 23 Feb. 1968 (fr), *A. Molina R. & Montalvo 21607* (F, NY).

*Psychotria lundellii* may be recognized by its narrow (length/width = 3) leaves drying glossy red-brown with few (usually 6–8) secondary veins and tertiary veins not evident, and its spherical fruit drying often glossy red-brown and appearing smooth outside due to the seed dorsal surface having 3–6 shallow irregular longitudinal furrows. *Psychotria lundellii* differs from the similar *P. chiriquina* in having smaller (5–6 vs. 8–10 mm long) stipules, brochidodromous (vs. eucamptodromous) secondary venation, shorter (2–2.5 vs. 4–6 mm) corolla tubes, and spherical (vs. ellipsoid) fruits. Material from El Salvador shows generally more secondary veins in the leaves than material gathered elsewhere.

Eight flowering specimens from Belize have been examined, and only the long-style morph has been found, suggesting that the short-style morph has been lost in populations in that country. One thrum has been found in Baja Verapaz, Guatemala (*Lundell & Contreras 21037*).

**42. *Psychotria mexiae*** Standley, Publ. Field Columbian Mus., Bot. Ser. 4: 296. 1929. TYPE: Mexico. Jalisco: Santa Cruz de Vallarta, wooded ravine on mountain side, 300 m, 9 Dec. 1926 (fr), *Mexia 1262* (holotype, F; isotypes, A, GH, MO, US—2 sheets). Figures 10h, 30.

*Palicourea nigrescens* M. Martens & Galeotti, Bull. Acad. Roy. Sci. Bruxelles 11(50): 136. 1844. TYPE: Mexico. Veracruz: Cordillera, June–Oct. 1840 (fl), *Galeotti 2653* (holotype, C). Not *Psychotria nigrescens* De Wild., Pl. Bequaert. 2: 393. 1924.

*Psychotria schippii* Standley & Steyermark, Publ. Field Mus. Nat. Hist., Bot. Ser. 23: 24. 1943. TYPE: Belize. Cayo: Valentin, limestone valley, June–July 1936 (fr), *Lundell 6193* (holotype, F; isotypes, GH, NY, US).

*Tree* or shrub, 2–5(–10) m tall; young stems sparsely puberulent, the bark pale, mottled, with



irregular ridges and raised lenticels; stipules sheathing, linear, 12–20(–40) × 1.5–3(–5) mm, glabrous, caducous, leaving a pale ridge with or without red-brown fringe. *Leaves* petiolate; petioles 3–20 mm long, glabrous or sometimes sparsely tomentose below, flat above; blades membranous to subcoriaceous, elliptic, the apex long-acuminate, the base cuneate, (8–)10–20 × (2.5–)3–8.5 cm, glabrous above and below, sometimes sparsely tomentose along midvein below, drying green-brown to sometimes red-brown, the veins often reddish below; secondary veins 12–16(–18) pairs, diverging (55°–)60°–70°(–75°), brochidodromous to eucamptodromous, constantly arcuate, prominent below, glabrous, the axils sometimes with minute tufts of hairs below; tertiary veins inconspicuous to evident, orthogonal reticulate to rarely random reticulate. *Inflorescences* terminal or pseudoaxillary, globose panicles of cymes; panicle branched to 4 degrees; main axis (1–)2–4.5 cm long, the peduncle lacking; secondary axes in (3)4(5) ranks, the first-rank axes 2 or 4, equal, 1–3 cm long, the second-rank axes 2 or 4, equal, 0.5–1.5 cm long, the third-rank axes 2, 0.2–1 cm long, the fourth-rank axes 2, 0.2–0.7 cm long, the fifth-rank axes 2, 0.1 cm long; cymes branched to (1)2 degrees; bracts and bracteoles not evident. *Flowers* on pedicels 0.5–1 mm long; calyx cup-shaped, the tube 0.3 mm long, sometimes minutely puberulent; corolla white, often drying pink, the tube cylindrical, 2.5–4.5 × 1.5 mm, white pubescent in throat, the lobes 5, lanceolate, 1.5–2 × 1 mm; stamens 5, the filaments 2–3.5 mm long in pins, 3–5 mm long in thrums, the anthers 0.8–1 mm long; style 4–7 mm long in pins, 2–3 mm long in thrums, the branches spathulate. *Fruit* when dry ellipsoid to spherical, 4.5–5(–6) mm long, 3.5–4.5(–5) mm diam., maturing red, drying often shiny red-brown; persistent calyx a tubular beak to 0.5 mm long; seed dorsal surface with 5–8 deep irregular longitudinal furrows, the ventral surface with 2 deep regular plus usually 2–4 additional irregular longitudinal furrows (Fig. 10h).

*Distribution* (Fig. 30). Scattered from Mexico through northern Costa Rica, most common in a band from Veracruz and Chiapas, Mexico, through Petén, Guatemala, into Belize, at elevations of 400–1,800 m in regions of premontane moist forest with equatorial to tropical climate. *Psychotria mexiae* has been collected in flower February–July and in fruit September–April.

*Selected specimens examined.* MEXICO. CHIAPAS: Mpio. Jitotol, adjacent to large double waterfall, 6–8 km W of Jitotol, 1,450 m, 16 Dec. 1971 (fr), *Breedlove*

23269 (ENCB, F, MO, NY); Mpio. Ocosingo, nr. La Canja, 350 m, 2 Apr. 1973 (fl), *Breedlove 34538* (ENCB, MO, NY); Mpio. Ocozocoautla de Espinosa, 18–20 km N of Ocozocoautla along rd. to Mal Paso, 800 m, 20 Oct. 1971 (fr), *Breedlove & Thorne 20960* (DUKE, ENCB, F, MO, NY); Mpio. La Trinitaria, along Comitan River at its sumidero, Lago de Montebello, 42 km NE of La Trinitaria, 1,300 m, 23 Oct. 1971 (fr), *Breedlove & Thorne 21203* (DUKE, ENCB, F, MO, NY). GUERRERO: Montes de Oca, San Antonio–Buenos Aires, 10 June 1937 (fl), *Hinton et al. 10295* (B, K, US); Dto. Mina, Puerto Rico, 1,750 m, 15 Apr. 1939 (fl), *Hinton et al. 14166* (NY, US). OAXACA: Dto. Ixtlán, Sierra de Juárez, ruta 175 Tuxtepec a Oaxaca, 0.5 km al SW de La Esperanza, 1,700 m, 28 May 1983 (fl), *Cedillo & Lorence 2345* (MEXU); *Lorence & Cedillo 4180* (MEXU). VERACRUZ: Mpio. Soteapan, Sierra de Sta. Marta al N de Ocotál Grande, 1,365 m, 7 Jan. 1972 (fr), *Beaman 5410* (MEXU—2 sheets); Mpio. San Andrés Tuxtla, Cerro Vigía, 18°27'N, 95°21'W, 950 m, 24 Jan. 1972 (fr), *Beaman 5513* (F, MEXU—2 sheets, NY); Mpio. San Andrés Tuxtla, Cerro Mantagaga, 13 km al NE de San Andrés Tuxtla, 1,400 m, 1 Feb. 1972 (fr), *Beaman 5594* (MEXU—2 sheets); Mpio. San Andrés Tuxtla, Cerro Vigía, 23 Feb. 1972 (fl), *Beaman & Alvarez 5772* (F, MEXU—3 sheets, NY); vertiente E de Pico de Orizaba, camino de Coscomatepec a Calchualco, 1,800 m, 10 Mar. 1982 (st), *Lorence et al. 3891* (MEXU); Mpio. de Yecuatla, Loma Santa Rita, 1,480 m, 12 Jan. 1972 (fr), *Ventura 4763* (ENCB, MEXU); Mpio. Banderilla, Banderilla, 1,500 m, 29 Nov. 1976 (fr), *Ventura 13658* (ENCB); Mpio. Atzalán, Alseseca, 1,100 m, 6 June 1980 (fl), *Ventura 17258* (MO). GUATEMALA. ALTA VERAPAZ: Seból, ca. 4 km on Cobán rd., 120 m, 16 Apr. 1964 (fl), *Contreras 4345* (MO); Rubelsanto, Balastlera, 16 July 1975 (early fr), *Lundell & Contreras 19523* (MO). PETÉN: Dolores, km 86–87 E of Machaquila Rd., 25 Sep. 1961 (fr), *Contreras 2968* (MO); Tikal National Park, in ramonal between Temple 4 and “H” group, 13 Mar. 1966 (fr), *Contreras 5580* (ENCB, F, MO, NY); La Cumbre, E of km 138 bordering village, 29 Sep. 1966 (fr), *Contreras 6282* (MO); entre Cristo Rey y Poptún, Yaltutú, 433 m, 11 Nov. 1965 (fr), *A. Molina R. 15578* (F). BELIZE. BELIZE: Western Hwy., mi. 35–36, 23 June 1973 (fl), *Dwyer 10905* (GH, MO); cuevas at Little John’s Camp, 10 July 1973 (early fr), *Dwyer 11577* (GH, MO—2 sheets). CAYO: vic. Cuevas S of Millionario, 570 m, 29–30 May 1973 (fl), *Croat 23581* (DUKE, MO—2 sheets, US); Macal River, bridge between Augustine & Cuevas, 10 July 1972 (fl), *Dwyer & Pippin 10193* (ENCB, MO, NY). TOLEDO: 2.3 km S of Mayan village of San José, ca. 8 km W of Columbia Forest Station, river banks on limestone, 12 June 1973 (fl), *Croat 24302* (F, MO, NY). HONDURAS. SANTA BARBARA: Montaña Sta. Barbara, above Sauce nr. Lake Yojoa, 1,000 m, 7 Aug. 1948 (early fr), *L. O. Williams & Molina 14515* (F, GH, MO). NICARAGUA. ESTELÍ: Laguna de Mirafior, 13°15'N, 86°15'W, ca. 1,300 m, 21 Feb. 1982 (fr), *P. P. Moreno 15476, 15487* (MO). JINOTEGA: Laguna Miraflores, 13°15'N, 86°15'W, 1,250–1,300 m, 10–11 June 1981 (fl), *Henrich & Stevens 325* (MO). MATAGALPA: 6–10 km NE of Matagalpa, rd. to El Tuma, 1,000 m, 14–16 Jan. 1963 (fr), *L. O. Williams et al. 23844* (NY, US). COSTA RICA. GUANACASTE: La Tejona, N of Tilarán, 600–700 m, 25 Jan. 1926 (fr), *Standley & Valerio 45770* (US); Naranjos Agrios, 600–700 m, 29 Jan. 1926 (fr), *Standley & Valerio 46375* (US).



*Palicourea nigrescens* and *Psychotria schippii* are morphologically identical to *P. mexiae* and are therefore included. The existing name *Psychotria nigrescens* De Wild. (dating to 1924) leaves "*mexiae*" as the oldest available epithet.

*Psychotria mexiae* may be recognized by its elliptic long-acuminate leaves drying green-brown to red-brown with veins drying reddish below; globose panicles without peduncle and with 4 equal secondary axes in each of the first 2 ranks; long (2.5–4.5 mm) corolla tube often drying pink; and ellipsoid to spherical fruit drying often shiny red-brown and appearing smooth outside due to the irregularity of the furrows on the dorsal surface of the seed. Corolla tubes are shorter in specimens from Belize (2.5 mm) than in those from Mexico (4–4.5 mm), and the stamens and styles are scaled down accordingly. Fruits are larger (5–6 mm long) in specimens from Veracruz and Guatemala than from elsewhere (4.5–5 mm long).

The exerted pistil of the pin morph is usually longer than the exerted stamens of the thrum (4–7 vs. 3.5–5.5 mm).

**43. *Psychotria olgae*** Dwyer & Hayden, Ann. Missouri Bot. Gard. 55: 42, fig. 3. 1968. TYPE: Panama. Panamá: between Cerro Jefe and Eneida, 630–870 m, 17 Jan. 1968 (fr), *Dwyer et al.* 8193 (holotype, MO; isotypes, DUKE, F, NY). Figures 10g, 29.

*Tree* 2–8(–10) m tall; young stems puberulent, the bark pale, slightly ridged longitudinally; stipules lanceolate, sometimes biacuminate, 3–5 × 1.5 mm, ciliate at apex, caducous, leaving a pale ridge with red-brown fringe. *Leaves* petiolate; petioles 2–3 mm long, glabrous, flat above, robust; blades coriaceous, elliptic to obovate, the apex obtuse to rounded, the base subcordate, the margins inrolled, (5–)6–10 × (1.5–)2.5–4.5 cm, glabrous above and below, drying green-brown to red-brown; secondary veins 5–7 pairs, diverging 60°–65°, eucamptodromous to brochidodromous, constantly arcuate, prominulous below, glabrous, the axils lacking domatia or hairs; tertiary veins not evident. *Inflorescences* terminal or pseudoaxillary, panicles of glomerules; panicle branched to 3 degrees; main axis 2.5–9 cm long, the peduncle 1.5–5.5 cm long; secondary axes in 2 ranks, the first-rank axes 2, 1–3 cm long, the second-rank axes 2, 0.4–1 cm long; bracts and bracteoles irregular, 1 mm long, ciliate. *Flowers* pedicellate, the pedicels 2–3 mm long; calyx cup-shaped, the tube 1 mm long, the lobes 5, broad triangular to not evident, to 0.5 mm long, minutely ciliate; corolla green, leathery, the

tube cylindrical, 2.5–3.5 × 2 mm, white pubescent in throat, the lobes 5, ovate, 2.5–3 × 1.5 mm; stamens 5, the filaments 3–3.5 mm long in pins, 4 mm long in thrums, the anthers 1–1.5 mm long; style 6 mm long in pins, 2.5–3 mm long in thrums, the branches linear. *Fruit* when dry ellipsoid to slightly obovoid, 9–10 mm long, 5.5–7 mm diam., maturing red, drying red-brown; persistent calyx a tubular beak to 1 mm long; seed dorsal surface with 4 deep regular and numerous irregular longitudinal furrows, the ventral surface with 2 deep regular and several irregular longitudinal furrows (Fig. 10g).

*Distribution* (Fig. 29). Known only from the region of Cerro Jefe, eastern Panamá Province, Panama, at 800–1,200 m elevation in premontane wet forest with equatorial-mountainous climate. This species has been collected in flower in March, June, and July and in fruit in October and January.

*Additional specimens examined.* PANAMA. PANAMÁ: Cerro Jefe, to 930 m, 12 Mar. 1968 (fl), *Dwyer et al.* 7288 (F, MO); rd. from Pan-American Hwy. to Cerro Jefe, 21.7 km from Pan-Am. Hwy., 22 June 1977 (fl), *Folsom* 3817 (CR, MO); Cerro Jefe, on top nr. antenna, ca. 1,200 m, 19 Jan. 1977 (fr), *Folsom & Harp* 1368 (CR, MO); Cerro Jefe region, 1,000 m, 8 Jan. 1975 (fr), *Luteyn & Wilbur* 4655 (DUKE); Cerro Jefe, ca. 1,000 m, 14 July 1975 (fl), *Mori* 7122 (MO, US); 14 July 1975 (fl), *Mori* 7133 (MO); 5 June 1975 (fl), *Mori & Kallunki* 6507 (MO—2 sheets, US); Cerro Jefe, 1.5 km before weather station, 850–900 m, 8 Oct. 1980 (fr), *Sytsma* 1504 (MO); Cerro Jefe, 850–900 m, 29 Oct. 1980 (fr), *Sytsma* 1990 (MO).

*Psychotria olgae* may be recognized by its coriaceous leaves with subcordate base and inrolled margins and by its large (9–10 × 5.5–7 mm) ellipsoid to slightly obovoid fruit.

The reproductive organs are longer at both levels in the pin morph than in the thrum.

**44. *Psychotria panamensis*** Standley, Contr. U.S. Natl. Herb. 18: 132. 1916. TYPE: Panama. Chiriquí: S slope of Cerro Horqueta, Los Sigüas Camp, ca. 1,700 m, 17–19 Mar. 1911 (fl, fr), *Pittier* 3194 (holotype, US). Figures 2d, 7e, 28.

*Shrub* or tree, (1–)2–13 m tall; young stems minutely puberulent to short-ferruginous pubescent, the bark usually furrowed longitudinally; stipules usually sheathing, lanceolate, (10–)20–80 × (2.5–)3.5–7 mm, glabrous, minutely puberulent or red-brown ciliate, caducous, leaving a pale ridge with red-brown fringe (Fig. 2d). *Leaves* petiolate; petioles (0.5–)2–4.5(–5) cm long, glabrous or puberulent, flat or grooved above; blades membranous



to subcoriaceous, elliptic to obovate, the apex acuminate, the base subcordate to cuneate, (7-)9-28 × (2.5-)4-11(-13) cm, glabrous above and below, the midvein sometimes puberulent below, drying red-brown to green-brown; secondary veins (6-)8-19(-22) pairs, diverging 45°-70°, eucamptodromous to sometimes brochidodromous, constantly arcuate or straight then arcuate near margin, elevated below, glabrous or minute-puberulent, the axils lacking domatia or hairs, or having segments of red-brown hairs along midvein and secondary vein; tertiary veins inconspicuous, orthogonal reticulate to percurrent. *Inflorescences* terminal or pseudoaxillary, panicles of cymes or glomerules (Fig. 7e); panicle branched to 3-5 degrees; main axis 1.5-12 cm long, the peduncle usually lacking or 1.5-3 cm long; secondary axes in 3-7(-8) ranks, the first-rank axes 2 or 4, equal or subequal, 0.8-7 cm long, the second-rank axes 2, 0.4-4 cm long, the third-rank axes 2, 0.2-3 cm long, the fourth-rank axes 2, 0.2-2 cm long, the fifth-rank axes 2, 0.1-1 cm long, the sixth-rank axes 2, 0.2-0.6 cm long, the seventh-rank axes 2, 0.1-0.2 cm long, the eighth-rank axes 2, 0.1 cm long; cymes branched to 1-3 degrees; bracts and bracteoles irregular or not evident, to 1 mm long, ciliate. *Flowers* pedicellate, the pedicels 0.5-1 mm long, sometimes (var. *ixtlanensis*) with minute spheroidal glands; calyx cup-shaped, the tube 0.3-0.5 mm long, the lobes 0 or 5, triangular to not evident, to 0.3 mm long, minutely ciliate; corolla white or cream, the tube cylindrical, 2-3 × 1.5-2 mm, white pubescent in throat, the lobes 5, lanceolate or triangular, 1.5-2.5 × 0.8-1 mm; stamens 5, the filaments 2-3 mm long in pins, 3.5-5 mm long in thrums, the anthers 0.7-1 mm long; style 4-6 mm long in pins, 2.5-3 mm long in thrums, the branches clublike, spatulate, or linear. *Fruit* when dry ellipsoid to obovoid, 4.5-8 mm long, 3.5-6.5(-7) mm diam., maturing red, drying red-brown to sometimes (var. *ixtlanensis*) red-black; persistent calyx inconspicuous or a beak to 1 mm long; seed dorsal surface with 4 deep irregular or 7-10 irregular longitudinal furrows, the ventral surface with 2 central furrows often plus 2 deep or several irregular lateral longitudinal furrows.

*Distribution* (Fig. 28). Southern Mexico through Panama, at elevations of 0-2,100 m. Varieties *compressicaulis* and *magna* occur at lower elevations, while varieties *ixtlanensis* and *panamensis* occur mostly above 1,000 m.

*Psychotria panamensis* may be recognized by its large (usually 20-80 mm long) lanceolate sheathing stipules, leaves drying usually dark red-

brown, inflorescences with robust secondary axes usually 2 per rank in 3-7(-8) ranks and usually with no peduncle, and large (usually 4.5-8 × 3.5-6.5 mm) ellipsoid fruit drying almost always red-brown and without a conspicuous persistent calyx.

KEY TO VARIETIES OF *PSYCHOTRIA PANAMENSIS*

- 1a. Inflorescence main axis 1.5-3 cm long, the secondary axes in 3(4) ranks; fruit obovoid; endemic to Oaxaca ..... 44b. var. *ixtlanensis*
- 1b. Inflorescence main axis 5-12 cm long, the secondary axes in 5-7 ranks; fruit usually ellipsoid.
  - 2a. Fruit 4.5-5 × 3.5-4 mm; Caribbean eastern Panama ..... 44c. var. *magna*
  - 2b. Fruit 5.5 × 4.5 mm and larger.
    - 3a. Leaf blades 15-28 × 5.5-13 cm, the secondary veins 16-19; fruit 5.5-7 × 4.5-6 mm; lowland Caribbean Nicaragua and Costa Rica ..... 44a. var. *compressicaulis*
    - 3b. Leaf blades generally 9-15 × 4-6 cm, the secondary veins 8-16; fruit generally 7-8 × 5.5-6.5 mm; Mexico through Panama, mostly above 500 m ..... 44d. var. *panamensis*

**44a. *Psychotria panamensis* Standley var. *compressicaulis* (K. Krause) C. Hamilton**, *Phytologia* 64: 233. 1988. *Psychotria compressicaulis* K. Krause, *Bot. Jahrb. Syst.* 54: Beibl. 119: 44. 1916. TYPE: Costa Rica. Cartago: Tuis, 600 m, July 1898 (fl), *Pittier 12412* (holotype, B, destroyed, photo, GH; isotype, US). Figure 28.

*Shrub* or *tree* (1-)2-10 m tall; stipules sheathing, lanceolate, (10-)20-35 × (3-)3.5-5 mm, glabrous. *Leaves*: blades membranous, the base cuneate to rarely subcordate, (8-)15-28 × (3-)5.5-13 cm, drying dark red-brown; secondary veins (13-)16-19(-20) pairs, the axils lacking domatia or hairs; tertiary veins inconspicuous, orthogonal reticulate to percurrent. *Inflorescences*: panicle branched to 4-5 degrees; main axis 7-9 cm long, the peduncle usually lacking or ca. 1.5 cm long; secondary axes in 6-7 ranks, the first-rank axes 2, 4.5-7 cm long, the second-rank axes 2, 2.2-4 cm long, the third-rank axes 2, 1-2 cm long, the fourth-rank axes 2, 0.8-1.5 cm long, the fifth-rank axes 2, 0.4-0.9 cm long, the sixth-rank axes 2, 0.2-0.6 cm long, the seventh-rank axes 2, 0.1-0.2 cm long; cymes branched to 2 degrees. *Flowers*: corolla white, the tube 2-2.5 × 1.5-2 mm, the lobes lanceolate, 1.5-2 × 1 mm; stamens 5, the filaments not seen in pins, 3.5-4 mm long in thrums; style not seen in pins, 2.5-3 mm long in thrums, the branches linear. *Fruit* when dry ellipsoid, 5.5-7 mm long, 4.5-6 mm diam., drying



red-brown; persistent calyx not evident; seed dorsal surface with 4 deep irregular longitudinal furrows, the ventral surface with 2 deep incompletely divided plus several irregular longitudinal furrows.

*Distribution* (Fig. 28). Caribbean lowlands of Nicaragua and Costa Rica, at 0–200 m elevation in tropical moist to wet (to premontane wet) forest with equatorial climate. This variety has been collected in flower July–August and in fruit November–July.

*Selected specimens examined.* NICARAGUA. RÍO SAN JUAN: nr. Caño Chontaleño, 20 km NE of El Castillo, Río Indio watershed, 200 m, 7–9 Mar. 1978 (fr), *Neill 3402* (MO). ZELAYA: Mpio. de Nueva Guinea, Bocas de Piedra, 2 Nov. 1982 (st), *Laguna 131* (MO); logging camp nr. Qda. La Talolinga, 11°51'N, 84°26'W, 170 m, 19 Aug. 1983 (fl), *J. Miller & Sandino 1165* (MO); Monkey Point, 3 km al S, 11°37'N, 83°40'W, 10 m, 24 Oct. 1981 (early fr), *P. P. Moreno & Sandino 12259* (MO); Río Punta Gorda, Atlanta, "La Richard," 200 m al SE, 11°32'N, 84°05'W, 20 m, 13 Nov. 1981 (fr), *P. P. Moreno & Sandino 13027a* (MO); new rd. to Mina Nueva America, leading more or less W from 14.3 km N of El Empalme on main rd. to Rosita, 7.7 km from main rd., 23 Feb. 1979 (fr), *W. D. Stevens 12708* (MO); vic. junction of rd. to Alamikamba with rd. between El Empalme and Limbaika, 13°32'N, 84°30'W, 25 m, 24 Feb. 1979 (fr), *W. D. Stevens 12740* (MO). COSTA RICA. ALAJUELA: 2–3 km NW of Bajo, Rodríguez, ca. 30 km N of La Balsa de San Ramón, 300 m, 8 June 1976 (fr), *J. Utley & K. Utley 5137* (DUKE). HEREDIA: Finca La Selva, the OTS field station on the Río Puerto Viejo, 100 m, 5 Apr. 1979 (fr), *Beach 1418* (CR, DUKE, MO); 4 Aug. 1980 (fl), *MacDougal 1092* (DUKE); Sarapiquí, Tirimbina, Istarú Farm, 220 m, 26 Nov. 1971 (fr), *Lent 2246* (CR, DUKE, MO, NY, US). PUNTARENAS: Corcovado National Park, slopes above Llorona, 8°36'N, 83°42'W, 13 July 1977 (fl), *Liesner 3263* (CR, MO).

All eleven flowering collections are thrum morphs, suggesting that the variety is thrum-monomorphic.

**44b. *Psychotria panamensis* Standley var. *ixtlanensis*** C. Hamilton, *Phytologia* 64: 233. 1988. TYPE: Mexico. Oaxaca: Dto. de Ixtlán, 21.4 km al S de Valle Nacional, 17°41'N, 96°18'W, 1,140 m, 28 Nov. 1979 (fr), *Wendt et al. 2258* (holotype, MEXU—317322; isotype, ENCB). Figure 28.

*Shrub* 2–4 m tall; stipules lanceolate-acuminate, (10–)30–60 × (2.5–)5–7 mm, minutely puberulent. *Leaves*: blades membranous, the base cuneate to attenuate, (9–)16–21 × (3–)5–7.5 cm, drying green-brown; secondary veins 12–17 pairs, the axils lacking domatia or hairs; tertiary veins inconspicuous, orthogonal reticulate. *Inflorescences*: panicle branched to 3–4 degrees; main axis 1.5–3 cm long, the peduncle lacking; secondary axes

in 3(4) ranks, the first-rank axes (2)4, subequal, 0.8–2.2 cm long, the second-rank axes 2, 0.4–1.0 cm long, the third-rank axes 2, 0.2–0.6 cm long, the fourth-rank axes 2, 0.2 cm long; cymes branched to 1–2 degrees. *Flowers*: corolla cream, the tube 3 × 1.5 mm, the lobes triangular, 1.5 × 1 mm; stamens 5, the filaments 2–2.5 mm long in pins, not seen in thrums; style 4 mm long in pins, not seen in thrums, the branches short, club-like. *Fruit* when dry obovoid, 5–6 mm long, 4–4.5 mm diam., drying dark red-brown to red-black; persistent calyx inconspicuous or a minute beak to 0.5 mm long; seed dorsal surface with 4 deep irregular longitudinal furrows, the ventral surface with 2 incompletely divided central plus 2 deep lateral longitudinal furrows.

*Distribution* (Fig. 28). Known only from type region of Ixtlán, Oaxaca, Mexico, at ca. 900–1,140 m elevation in a region of evergreen to subevergreen forest with tropical-mountainous climate. This variety has been collected in flower April–June and in fruit September, November, and April.

*Selected specimens examined.* MEXICO. OAXACA: Dto. de Ixtlán, Sierra de Juárez, a 2.5 km al NE de Puerto Eligio, 900 m, 2 June 1983 (fl), *Cedillo & Lorence 2397* (MEXU); entre Vista Hermosa y Comaltepec, a 1.5 km al S de Vista Hermosa, Sierra Juárez, 16 Sep. 1965 (fr), *G. Martínez C. 296* (ENCB, MO); Dto. de Ixtlán, 5.3 km al N de Vista Hermosa, carr. a Oaxaca–Tuxtepec, 27 Sep. 1982 (fr), *Torres & Cedillo 1461* (ENCB, MEXU).

This variety, with its leaves drying greenish and fruit obovoid, may be the result of local introgression involving *Psychotria trichotoma* in the Ixtlán region of Oaxaca.

Four flowering collections are all of the pin morph, suggesting (albeit weakly;  $p = 0.125$ ) that the variety may be pin-monomorphic.

**44c. *Psychotria panamensis* Standley var. *magna*** (Standley) C. Hamilton, *Phytologia* 64: 234. 1988. *Psychotria magna* Standl., *Contr. U.S. Natl. Herb.* 18: 131. 1916. TYPE: Panama. Colón: Loma de la Gloria, nr. Fató (Nombre de Dios), 10–104 m, Aug. 1911 (fl), *Pittier 4092* (holotype, US-679188; isotype, US-693188). Figure 28.

*Shrub*; stipules not seen. *Leaves*: blades membranous, the base cuneate, 17–24 × 7–11 cm, drying red-brown; secondary veins 14–22 pairs, the axils lacking domatia or hairs; tertiary veins inconspicuous, percurrent. *Inflorescences*: panicle branched to 5 degrees; main axis 10–12 cm long, the peduncle lacking; secondary axes in 6 ranks,



the first-rank axes 2, 6 cm long, the second-rank axes 2, 4 cm long, the third-rank axes 2, 3 cm long, the fourth-rank axes 2, 2 cm long, the fifth-rank axes 2, 1 cm long, the sixth-rank axes 2, 0.6 cm long; cymes branched to 1–3 degrees. *Flowers*: corolla color unknown, the tube 2–2.5 × 1.5 mm, the lobes lanceolate, 1.5–2 × 0.8 mm; stamens 5, the filaments not seen in pins, 3.5 mm long in thrums; style not seen in pins, 2.5 mm long in thrums, the branches clublike or linear. *Fruit* when dry ellipsoid to slightly obovoid, 4.5–5 mm long, 3.5–4 mm diam., drying dark red-brown; persistent calyx a minute beak; seed dorsal surface with 4 deep irregular longitudinal furrows, the ventral surface with 2 incompletely divided central plus 2 deep lateral longitudinal furrows.

*Distribution* (Fig. 28). Known only from the Caribbean coast of Panama just east of the Panama Canal in tropical moist forest with equatorial-tropical climate. This variety has been collected in flower in August and in fruit in October.

*Additional specimens examined*. PANAMA. SAN BLAS: trail E of Cangandí–Mandinga airport rd., 2–5 mi. S of Mandinga airport, 27 Oct. 1967 (fr), *Duke 14782* (MO, US).

The only flowering collection is of a thrum flower morph.

**44d. *Psychotria panamensis* Standley var. *panamensis*.** Figure 28.

*Psychotria grandistipula* Standley, J. Wash. Acad. Sci. 18: 276. 1928, not *Psychotria grandistipula* Merr., J. Asiat. Soc. Mal. 1: 42. 1923. TYPE of *P. grandistipula* Standl.: Costa Rica. San José: vic. Sta. María de Dota, ca. 1,600 m, 26 Dec. 1925 (fr), *Standley & Valerio 43268* (holotype, US).

*Psychotria yunckeri* Standley in Yuncker, Publ. Field Mus. Nat. Hist., Bot. Ser. 17: 397. 1938. TYPE: Honduras. Comayagua: nr. summit of range above El Achote, above plains of Siguatopeque, 1,850 m, 21 July 1936 (fl), *Yuncker et al. 6013* (holotype, F; isotypes, GH, K, MO).

*Psychotria molinae* Standley, Ceiba 1: 46. 1950. TYPE: Honduras. Francisco Morazán: drainage of Río Yeguare, 14°N, 87°W, 2,000 m, 20 Aug. 1946 (fl), *L. O. Williams & Molina 10390* (holotype, F—1264188; isotypes, F, GH).

*Psychotria durilancifolia* Dwyer, Ann. Missouri Bot. Gard. 67: 372. 1980. TYPE: Panama. Panamá: El Llano-Cartí Rd., vic. Gorgas Lab Mosquito Control Project site at km 12, 1 Aug. 1974 (fl), *Croat 26028* (holotype, MO—2240525).

*Tree* (2–)4–13 m tall; stipules sheathing, lanceolate, (10–)30–80 × (3.5–)5–7 mm, red-brown ciliate. *Leaves*: blades membranous to subcoriaceous, the base cuneate to subcordate, (7–)9–

15(–22) × (2.5–)4–6(–10) cm, drying deep red-brown or sometimes green-brown; secondary veins (6–)8–16(–20) pairs, the axils lacking domatia or hairs or sometimes with segments of red-brown hairs along midvein and secondary veins below; tertiary veins inconspicuous, orthogonal reticulate. *Inflorescences*: panicle branched to 3–4 degrees; main axis (2.5–)5–9 cm long, the peduncle usually lacking, or 1.5–3 cm long; secondary axes in (4–)5–7(–8) ranks, the first-rank axes 2, (1–)2–6.5 cm long, the second-rank axes 2, (0.4–)1–3.5 cm long, the third-rank axes 2, (0.2–)0.6–2 cm long, the fourth-rank axes 2, (0.1–)0.2–1.5 cm long, the fifth-rank axes 2, 0.1–0.6 cm long, the sixth-rank axes 2, 0.4 cm long, the seventh-rank axes 2, 0.2 cm long, the eighth-rank axes 2, 0.1 cm long; cymes branched to 1–2 degrees. *Flowers*: corolla white, the tube 2–3 × 1.5–2 mm, the lobes lanceolate, 2–2.5 × 1 mm; stamens 5, the filaments 2.5–3 mm long in pins, 4–5 mm long in thrums; style 4–6 mm long in pins, 2.5 mm long in thrums, the branches spatulate. *Fruit* when dry ellipsoid, (6–)7–8 mm long, (4.5–)5.5–6.5(–7) mm diam., drying red-brown; persistent calyx usually a beak to 1 mm long; seed dorsal surface with 7–10 irregular longitudinal furrows, the ventral surface with 2 deep plus several irregular longitudinal furrows.

*Distribution* (Fig. 28). Continuous along the central cordillera from Veracruz, Mexico, to eastern Panama, at 200–2,100 m elevation, almost all above 500 m, in premontane to low montane wet forest to rainforest with usually equatorial to tropical-mountainous climate. It has been collected in flower throughout the year, primarily March–August, and in fruit throughout the year, primarily November–April.

*Selected specimens examined*. MEXICO. CHIAPAS: Mpio. Berriozábal, 13 km N of Berriozábal nr. Pozo Turipache and Finca El Suspiro, 1,000 m, 24 July 1972 (fr), *Breedlove 26311* (F, MEXU, MO); Mpio. La Trinitaria, E of Laguna Tzikaw, Monte Bello National Park, 1,300 m, 13 May 1973 (fl), *Breedlove 35141* (ENCB, MEXU, MO, NY); 16 Nov. 1972 (fr), *Breedlove & Dressler 29565* (MEXU, MO, NY); Mpio. Rayón, Selva Negra 10 km above Rayón Mezcalapa along rd. to Jitotol, 1,700 m, 25 Jan. 1973 (fr), *Breedlove & Smith 32414* (ENCB, MEXU, MO); Mpio. Angel Albino Corzo, nr. the Rancho Viejo of the Finca Prusia, 720 m, 23 Jan. 1968 (fr), *Ton 3581* (ENCB). OAXACA: Hwy. 175, 18.4 mi. S of Valle Nacional bridge, 1,500 m, 19 Feb. 1979 (fl), *Croat 48055* (CR, MO); Mpio. Matías Romero, 9.5 km por camino al SE del Aserradero La Floresta, 21.5 km al S de Esmeralda, 17°03'N, 94°43'W, 400 m, 25 May 1981 (fl), *Wendt et al. 3307* (MEXU); Mpio. Matías Romero, orilla N del Río Verde, 6.4 km al SE de Aserradero La Floresta sobre camino a Arroyo Amaca, 17°03'N,



- 94°45'W, 200 m, 30 Nov. 1981 (fr), *Wendt et al.* 3555 (MEXU). PUEBLA: Mpio. de Teziutlán, Río Frío, 1,450 m, 29 Mar. 1973 (fr), *Ventura* 8094 (ENCB). VERACRUZ: Mpio. San Andres Tuxtla, lado W de Cerro Mastagaga, ca. 13 km al NE de San Andres Tuxtla, 1,200 m, 29 Jan. 1972 (fr), *Beaman* 5564 (F, MEXU—2 sheets, MO); Mpio. de Sotepan, lado W de la Sierra de Santa Marta cerca del Ejido de Santa Marta, 1,220 m, 28 May 1972 (fl), *Beaman* 6007 (F, MEXU—2 sheets); Mpio. de Santiago Tuxtla, cima del Cerro Vigía, 950 m, 22 July 1972 (fr), *Beaman* 6391 (MEXU); Mpio. Atzalán, la Calavera, carret. Altotonga a Tlapacoyan, 1,500 m, 17 May 1973 (fl), *Chazaro & Dorantes* 110 (MEXU); Mpio. Sotepan, camino de Tebanca a Bastonal, 6–8 km al SE de Tebanca, 1,000–1,100 m, 26 Apr. 1982 (fl), *Lorence et al.* 4238 (MEXU); Mpio. Teocelo, 19°23'N, 96°57'W, 17 Feb. 1973 (fr), *Menéndez* 67 (MEXU); Mpio. Chocamán, 1 km N of Chocamán, gorge of river upstream from Chocamán–Coscomatepec hwy., 19°02'N, 97°01'W, 1,350 m, 7 Dec. 1981 (fr), *Nee* 23880 (MO); Mpio. Totutla, Zochiapa, 1,280 m, 25 Apr. 1972 (fl), *Ventura* 5288 (MEXU). GUATEMALA. BAJA VERAPAZ: Unión Barrios, E of km 154, 8 June 1975 (fl), *Lundell & Contreras* 19396 (LL); 3 km SE of Purulha, Sierra de los Minas, cloud forest, 1,800 m, 4 Jan. 1974 (fr), *L. O. Williams et al.* 43149 (F). CHIMALTENANGO: lower and middle SW slopes of Volcán Fuego, above Finca Montevideo, along Barranco Espinoza and tributary of Río Pantaleón, 1,200–1,600 m, 20 Sep. 1942 (early fr), *Steyermark* 52052 (F). IZABAL: Cerro San Gil, uppermost ridges and summit, 1,200–1,300 m, 26–27 Dec. 1941 (st), *Steyermark* 41968 (F). JALAPA: Volcán Jumay, N of Jalapa, 1,300–2,200 m, 1 Dec. 1939 (fl), *Steyermark* 32472 (F). QUEZALTENANGO: Volcán Zunil, 1,700 m, 31 July 1934 (fl), *Skutch* 890 (A, F, NY, US); lower S-facing slopes of Volcán Santa María, between Santa María de Jesús and Calahuaché, 1,300–2,000 m, 1–2 Jan. 1940 (fr), *Steyermark* 33417 (F). SAN MARCOS: S-facing slopes of Volcán Tajumulco, above Finca El Porvenir, 1,400–1,700 m, 9 May 1940 (fr), *Steyermark* 37415 (F); 1,300–1,500 m, 16 Mar. 1940 (fl), *Steyermark* 37948 (F). HONDURAS. COMAYAGUA: bosque de Montaña La Choca cerca de Qda. El Zope, 1,500 m, 15 Apr. 1957 (fr), *A. Molina R.* 8177 (F, US); Barranco Trincheras, 20 km al N de Siguatepeque, 1,400 m, 18 July 1962 (fr), *A. Molina R.* 10823 (F, NY); 10 km W of Siguatepeque, pine forest, 1,200 m, 29 July 1974 (early fr), *A. Molina R.* 30578 (ENCB, F, MO). DISTRITO CENTRAL: ca. 10 km N of Tegucigalpa, cloud forest, La Tigra, 16 Feb. 1972 (fr), *Clewell & M. Hernández* 3039 (TEFH). FRANCISCO MORAZÁN: Mt. Uyuca, nr. Zamorano, 1,500 m, 21 Feb. 1952 (fr), *Carlson* 2449 (F); Cerro de Uyuca, trail from Las Flores to La Labranza, 1,600–1,750 m, Oct.–Dec. 1948 (fl), *Standley* 13377 (F). INTIBUCA: Rastrojos del Pelón de Guise a lo largo de la quebrada, 1,600 m, 9 Apr. 1956 (fr), *A. Molina R.* 6370 (GH, US); Cordillera Opalaca, between Pela Naríz and Calaveras, rd. to La Esperanza, 2,000 m, 3 Sep. 1968 (fl), *A. Molina R.* 22615 (NY—2 sheets). LA PAZ: Cordillera Guajiquiro 5 km a Sabanetas, 2,100 m, 21 Mar. 1964 (fl), *A. Molina R. & A. Molina* 13882 (NY); Cordillera Guajiquiro, Montaña Verde, 1,900 m, 23 Mar. 1969 (fr), *A. Molina R. & A. Molina* 24394 (F, NY). LEMPIRA: Montaña de Celaque, 1,900 m, 18–22 Nov. 1974 (fr), *Hazlett s.n.* (MO). NICARAGUA. BOACO: Cerro Alegre, San José de Los Remates, 12°26'N, 85°44'W, 1,100–1,180 m, 11 Feb. 1983 (fr), *P. P. Moreno* 20240 (MO). CHONTALES: Cerro Oluma, 750 m, 4 Jan. 1984 (st), *Gentry et al.* 43930 (MO). ESTELÍ: Laguna de Mirafior, 13°15'N, 86°15'W, 1,260–1,300 m, 29 Aug. 1982 (fl), *Grijalva* 947 (MO); 29 Mar. 1983 (fr), *P. P. Moreno* 21132 (MO); Cerro Quiabu, ca. 8 km NO de Estelí, 1,500–1,600 m, 19 Oct. 1979 (fr), *Grijalva & Araquistain* 656 (MO—2 sheets). GRANADA: W slope of Volcán Mombacho, rd. and trail above Finca Sta. Ana, from reservoir to somewhat above Plan del Flores, 11°50'N, 85°58'W, 950–1,150 m, 1 Oct. 1977 (fl), *W. D. Stevens* 4327 (MO); Volcán Mombacho, Plan del Flores to W rim, cloud forest, 11°50'N, 85°58'W, 1,100–1,220 m, 14 Nov. 1978 (fr), *W. D. Stevens* 10830 (MO). JINOTEGA: 4 km al SE del Cerro Kilambé, 13°35'N, 85°40'W, 800–1,000 m, 25 Mar. 1981 (fr), *P. P. Moreno* 7459 (MO). MATAGALPA: El Comején, 1 km W de la carret. a Waslala, 13°15'N, 85°34'W, 600 m, 23 Feb. 1983 (fr), *P. P. Moreno & Robleto* 20569 (MO). RIVAS: Isla de Ometepe, N slope of Volcán Maderas on trail from Balgue to Laguna Maderas, 11°27'N, 85°32'W, 1,200 m, 23 Jan. 1981 (fr), *W. Hahn* 510 (MO); Isla de Ometepe, N de Volcán Concepción, 11°33'N, 85°37'W, 1,100–1,150 m, 11 Mar. 1981 (fl), *Sandino* 492 (MO). COSTA RICA. ALAJUELA: Sta. María National Park, 10°48'N, 85°16'W, 600 m, 8 Feb. 1978 (fr), *Liesner* 5218 (CR, MO); 15 km NW of San Ramón by air, Cerro Azahar, headwaters of Río San Pedro, 10°09'N, 84°34'W, 1,400–1,500 m, 14 May 1983 (fr), *Liesner et al.* 15563 (CR, MO); Zapote, 1,400 m, 17 Aug. 1938 (fl), *A. Smith* 1103 (A, F, MO); region of Zarcero, 1,600 m, 6 July 1937 (fl), *A. Smith* 4224 (F). GUANACASTE: Los Ayotes, nr. Tilarán, 600–700 m, 21 Jan. 1926 (fr), *Standley & Valerio* 45433 (US). HEREDIA: Volcán Barba, nr. San José de la Montaña, 1,600 m, 19 June 1965 (fl), *Hatheway* 1460 (US). PUNTARENAS: rd. to Las Alturas, 8°56'N, 82°51'W, 1,400 m, 10 July 1972 (fl, early fr), *Lent* 2727 (CR, F, MO). SAN JOSÉ: Pacific slope of Cerro Chirripó massif, 2,000 m, 7 Apr. 1969 (fl), *Davidse & Pohl* 1668 (F, MO, NY); vic. Sta. María de Dota, 1,500–1,800 m, 26 Dec.–Jan. 1926 (fr), *Standley & Valerio* 44098 (US). PANAMA. CHIRIQUÍ: trail from Bambito to Cerro Punta, along Río Chiriquí Viejo, 6 Apr. 1937 (fl, fr), *Allen* 308 (A, F, GH—2 sheets, MO—2 sheets, US); vic. “New Switzerland,” central valley of Río Chiriquí Viejo, 1,800–2,000 m, 6–14 Jan. 1939 (fl), *Allen* 1387 (F, GH, MO, NY, US); SO del campamento Fortuna, propiedad del IRHE, 8°45'N, 82°15'W, 1,000–1,200 m, 25 Sep. 1976 (early fr), *M. Correa A. et al.* 2796 (CR, MO); on NW side of Cerro Pando cloud forest, 21 July 1971 (fl), *Croat* 15990 (MO—2 sheets); 21 July 1971 (early fr), *Croat* 15993 (MO); Boquete, Cerro Horqueta, 1,500–1,800 m, 8 Aug. 1967 (fr), *Dwyer & Hayden* 7693 (DUKE, F, MO, NY); along Río Colorado, 8°50'N, 82°43'W, 1,200–1,400 m, 11 July 1983 (st), *Hamilton & Krager* 3773 (MO); Nueva Suiza, 8°52'N, 82°40'W, ca. 1,300 m, 21 Aug. 1982 (early fr), *Hamilton et al.* 763 (CR, MO); Sta. Clara region, 27 km NW of El Hato del Volcán, finca of R. Hartman, 1,500–1,600 m, 18 July 1975 (early fr), *Mori & Bolten* 7190 (MO). COCLÉ: foothills of Cerro Pilon, nr. El Valle, ca. 900 m, 5 Oct. 1967 (early fr), *Duke & Correa* 14672 (MO—2 sheets); 7 km N of El Copé, lumber camp, ca. 900 m, 11 Jan. 1977 (fl, fr), *Folsom* 1202 (MO); Coclesito rd., 20 Apr. 1978 (fr), *Hammel* 2558 (MO); 15–20 km NE of La Pintada towards Toabre, 600–1,000 m, 15 Feb. 1981 (fl), *Sytsma & D'Arcy* 3643 (MO). COLÓN: Cerro Santa Rita, ca. 6 mi. from the Transisthmian Hwy., 250 m, 13 Sep. 1979



(early fr), *Antonio 1804* (ENCB, MO); Santa Rita Ridge lumber rd., 11 Jan. 1968 (fr), *M. Correa A. & Dressler 600* (DUKE, GH, MO); Santa Rita Ridge, 23 Jan. 1968 (fr), *Dwyer & Correa 8423* (DUKE, MO—2 sheets, NY). DARIÉN: headwaters of Río Tuqueza, between Qda. Venado and Peje Swamp, 28 June 1967 (fl), *Bristan 1051* (MO). PANAMÁ: Cerro Jefe, Feb. 1968 (fr), *Gómez-Pompa et al. 3065* (MEXU, MO); El Llano-Cartí Rd., 8–11 km from Inter-American Hwy., 300–400 m, 13 Aug. 1975 (fl), *Mori 7734* (MO, US); Cerro Campana, ca. 10 km SE of Capira, trail to summit, 870–1,000 m, 7 Dec. 1974 (fr), *Mori & Kallunki 3556* (MO—2 sheets). VERAGUAS: rd. between Escuela Agrícola Alto Piedra and Río Dos Bocas, ca. 10 km from escuela, 530–620 m, 26 July 1974 (fl), *Croat 25878* (DUKE, F—2 sheets, GH, MO, NY); “Cerro Tute” ridge up from former Escuela Agrícola, Santa Fe, 8°35'N, 81°05'W, 800–1,000 m, 20 Feb. 1983 (fr), *Hamilton & Dressler 2986* (CR, MO); NW of Santa Fe, 1 km from Escuela Agrícola Alto de Piedra, 24 Feb. 1975 (fr), *Mori & Kallunki 4785* (ENCB, MO).

The morphologies of *P. grandistipula* Standl., *P. yunckeri*, *P. molinae*, and *P. durilancifolia* fall well within the broad range of *P. panamensis* var. *panamensis*, so these former species are merged with var. *panamensis*.

*Psychotria panamensis* var. *panamensis* shows great variation within its range, including the following: leaves from Veraguas, Panama, are narrower and more coriaceous than those from elsewhere; leaves from Colón, Panama, are unusually large; secondary veins are more numerous in material from Guatemala, Honduras, and Colón and fewer in material from Chiapas, Mexico, and from Coclé, Panamá, and Veraguas provinces in Panama; secondary vein angle of divergence is greatest in leaves from Chiriquí, Panama; secondary veins are brochidodromous in Nicaraguan specimens; inflorescences are largest in specimens from Panama and Costa Rica; flowers are generally larger in Costa Rican material; and the corolla tubes from Honduras are narrowest (1.5 mm).

**45. *Psychotria sarapiquensis*** Standley, Publ. Field Mus. Nat. Hist., Bot. Ser. 18: 1360. 1938. TYPE: Costa Rica. Heredia: Vara Blanca de Sarapiquí, 1,500 m, July–Sep. 1937 (fl), *Skutch 3330* (holotype, US; isotypes, GH, K, MO). Figure 31.

*Tree* 2–10 m tall; young stems glabrous, the bark smooth; stipules sheathing, lanceolate, 11–45 × 2–5 mm, glabrous, caducous, leaving a pale ridge with red-brown fringe. *Leaves* petiolate; petioles (0.5–)1–2.5(–3.5) mm, glabrous, grooved above; blades membranous to subcoriaceous, oblanceolate to narrowly (or rarely broadly) elliptic to lanceolate, the apex short-acuminate, the base

attenuate to cuneate, 6.5–15(–18) × 2–4.5(–8.5) cm, glabrous above and below, drying green-brown to red-brown; secondary veins 6–9(–11) pairs, diverging 30°–60°(–70°), eucamptodromous to brochidodromous, constantly arcuate to straight, prominulous below, glabrous, the axils lacking domatia or hairs; tertiary veins inconspicuous, orthogonal reticulate. *Inflorescences* terminal or pseudoaxillary, panicles of cymes; panicle branched to 3–4 degrees; main axis (2–)5–13 cm long, the peduncle lacking or 3–4.5 cm long; secondary axes in (3–)4–5 ranks, the first-rank axes 2, (1–)1.5–5.5 cm long, the second-rank axes 2, (0.3–)1–2.5 cm long, the third-rank axes 2, (0.1–)0.5–1.4 cm long, the fourth-rank axes 2, 0.3–0.8 mm long, the fifth-rank axes 2, 0.1 mm long; cymes branched to 1–2 degrees; bracts not evident; bracteoles irregular, ca. 0.5 mm long, fringed. *Flowers* pedicellate, the pedicels 1–3 mm long; calyx often drying paler than the pedicel, cup-shaped, the tube 0.3–0.5 mm long, the lobes not evident, glabrous; corolla green-white, the tube cylindrical, 2.5–3 × 2 mm, white pubescent in throat, the lobes 5, lanceolate, 2–3.5 × 1.2 mm; stamens 5, the filaments 2.5–3 mm long in pins, 4 mm long in thrums, the anthers 1.2–1.5 mm long; style 4–4.5 mm long in pins, 2.5 mm long in thrums, the branches short. *Fruit* when dry ellipsoid to slightly obovoid, 7–8 mm long, 4–5.5 mm diam., maturing red, drying black to red-brown; persistent calyx often a minute beak; seed dorsal surface with 4–5 irregular often plus several shallow irregular longitudinal furrows, the ventral surface with 2 deep plus several shallow irregular longitudinal furrows.

*Distribution* (Fig. 31). Disjunct, occurring in Veracruz, Mexico, at 400–900 m elevation, and along the cordillera in Costa Rica and Panama, at 600–1,600 m, in tropical moist to premontane wet forest with equatorial-mountainous to usually tropical-equatorial climate. *Psychotria sarapiquensis* has been collected in flower in January, February, May, and August and in fruit July–March.

*Selected specimens examined.* MEXICO. VERACRUZ: Mpio. Catemaco, cerro al E de Coyame, 900 m, 13 Dec. 1971 (fr), *Beaman 5307* (MEXU); Estación de Biología Tropical Los Tuxtles, 400 m, July 1975 (fr), *Chazaro 417* (ENCB, MEXU); Estación de Biología Tropical Los Tuxtles, Cerro “El Vigia,” 18 Mar. 1971 (fr), *Flores 50* (MEXU); Mpio. Catemaco, highest point on rd. from Catemaco to Sontecomapan, 18°29'N, 95°04'W, 510 m, 14 Jan. 1981 (fr), *Schatz & Nee 233* (F). COSTA RICA. GUANACASTE: Los Ayotes, nr. Tilarán, 600–700 m, 21 Jan. 1926 (fr), *Standley & Valerio 45344* (US). HEREDIA: Vara Blanca de Sarapiquí, 1,500–1,750 m, July–Sep. 1937 (fl), *Skutch 3282* (A, K, MO, US). PUNTARENAS: Monteverde, 1,600 m, 20 May 1981 (fl), *Haber 531*



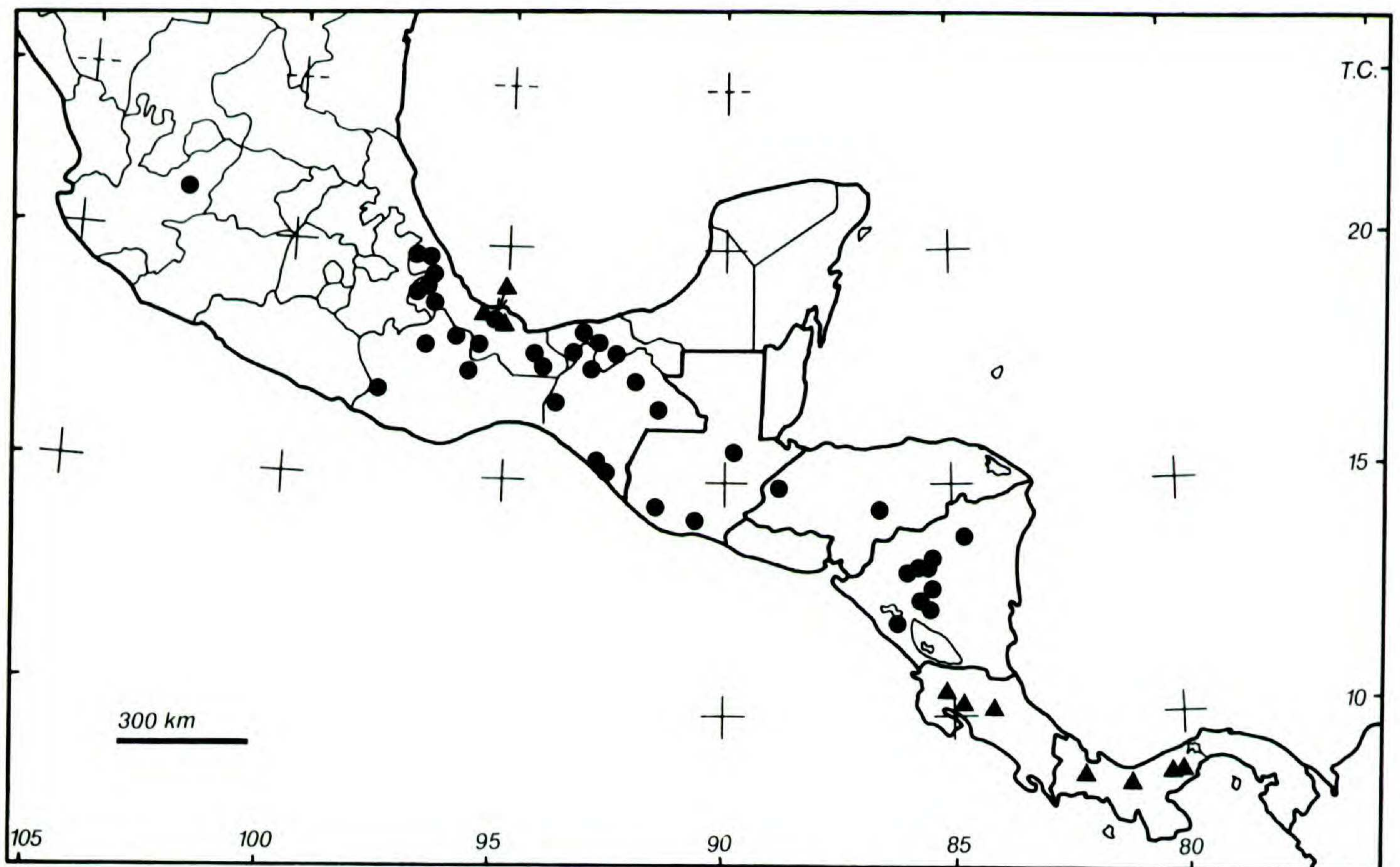


FIGURE 31. Distributions of *Psychotria sarapiquensis* (triangles) and *P. trichotoma* (circles) in Mesoamerica.

(MO). PANAMA. CHIRIQUÍ: Fortuna dam site, 1,200–1,400 m, 15 Sep. 1977 (fr), *Folsom et al.* 5505 (MO—2 sheets); 1,400–1,600 m, 15 Sep. 1977 (fr), *Folsom et al.* 5569 (MO); Qda. Aleman, 8 mi. N of Los Planes de Hornito IRHE Fortuna Hydroelectric Project, 8°45'N, 82°12'W, 1,200 m, 13 Mar. 1982 (early fr), *Knapp et al.* 4153 (MO). COCLÉ: base of Cerro Pilón above El Valle, 9 Jan. 1972 (early fr), *Gentry* 3648 (MO, NY). PANAMÁ: Cerro Campana above Su Lin Motel, 25 May 1971 (fl), *Croat* 14780 (GH, MO, NY); 800–1,000 m, 11 Mar. 1981 (fr), *Sytsma & D'Arcy* 3725 (MO). VERAGUAS: 5 mi. W of Santa Fe on rd. past Escuela Agricola Alto Piedra on Pacific side of divide, 800–1,200 m, 18 Mar. 1973 (fr), *Croat* 23037 (MO); above Santa Fe on slopes of Cerro Tute, 1,200–1,400 m, 28 Sep. 1972 (early fr), *Gentry* 6275 (F, GH, MO, NY); Alto Piedra, Santa Fe, 1,200 m, 27 Sep. 1972 (fr), *Lao* 519 (MO); N of Santa Fe, 0–2 km N of Escuela Agricola Alto de Piedra, 16 Oct. 1974 (fr), *Mori & Kallunki* 2510 (GH, MO); 16 Oct. 1974 (fr), *Mori & Kallunki* 2519 (GH, MO); 18 Oct. 1974 (fr), *Mori & Kallunki* 2638 (GH, MO); 26 Feb. 1975 (fl, fr), *Mori & Kallunki* 4868 (MO—2 sheets); 29 Mar. 1975 (fr), *Mori & Kallunki* 5325 (MO).

*Psychotria sarapiquensis* may be recognized by its usually narrow (length/width = 3) leaves with few (6–9[–11]) secondary veins and its large (7–8 mm long) ellipsoid to often obovoid fruit drying black or dark red-brown.

Mexican material is noteworthy for having lanceolate leaves with secondary veins diverging 60°–70°. Collections from the Fortuna and El Valle areas in Panama have large (to 18 cm long) broadly elliptic leaves with ca. 11 secondary veins, but

they fit this species concept in other respects. Three of the Costa Rican collections—*Dryer* 1539 (not cited above), *Skutch* 3282, and *Haber* 531—have subcoriaceous leaves drying red-brown and pedunculate inflorescences. *Psychotria sarapiquensis* is the most variable and/or the most problematic species in this treatment; it is conceivable that additional material from throughout its range will reveal it to be two or perhaps three different taxa.

**46. *Psychotria stockwellii* C. Hamilton, Phytologia 64: 235. 1988. TYPE: Costa Rica. Alajuela: region of Zarcero, 1,800 m, 18 Oct. 1937 (fl, early fr), *A. Smith* 543 (holotype, US; isotype, F). Figures 7i, 30.**

*Tree* or shrub, (1–)2–10 m tall; young stems puberulent, the bark pale, ridged longitudinally; stipules sheathing, ovate, 9–15 × 3.5–9 mm, glabrous, caducous, leaving a pale ridge with red-brown fringe. *Leaves* petiolate; petioles 0.5–2(–2.5) cm long, glabrous, terete; blades membranous, obovate or elliptic, the apex acuminate, the base attenuate, (8.5–)9–19 × (2–)3–7 cm, glabrous above and below, the midvein sometimes minutely puberulent below, drying dark brown above, slate brown or pale brown below; secondary veins (11–)14–17 pairs, diverging 60°–75°(–80°), eucamptodromous to sometimes brochidodromous, constantly arcuate, prominulous below, glabrous or minutely



puberulent below, the axils lacking domatia or hairs; tertiary veins conspicuous to evident, orthogonal reticulate. *Inflorescences* terminal or pseudoaxillary, spreading panicles of cymes (Fig. 7i); panicle branched to 3–4 degrees; main axis (7–)9–12 cm long, the peduncle (4–)5–9 cm long; secondary axes in 4–5 ranks, usually diverging over 90°, the first-rank axes 2, 1.8–5 cm long, the second-rank axes 2(4), 1–2.5 cm long, the shorter pair when present 0.4 cm long, the third-rank axes 2, 0.7–1.5 cm long, the fourth-rank axes 2, 0.4–0.6 cm long, the fifth-rank axes 2, 0.3 cm long; cymes branched to 1–2 degrees; bracts and bracteoles triangular, 0.5–2 mm long, ciliate. *Flowers* on pedicels 0.5–1.5 mm long; calyx cup-shaped, the tube 0.8 mm long, the lobes 5, triangular, often reflexed, 0.7 mm long, puberulent; corolla cream, the tube cylindrical, 4–5 × 1.5–2 mm, white pubescent in throat, minutely puberulent without, the lobes 5, ovate, 2 × 1 mm; stamens 5, the filaments 3.5–4 mm long in pins, 4.5–5.5 mm long in thrums, the anthers 1–1.2 mm long; style 6–7 mm long in pins, 3–4 mm long in thrums, the branches clublike or linear. *Fruit* when dry ellipsoid, 5–6 mm long, 4.5–5 mm diam., maturing red, drying dark red-brown; persistent calyx not evident or a beak or ring drying pale brown; seed dorsal surface with 6–10 irregular longitudinal furrows, the ventral surface with 2 deep regular plus sometimes several irregular longitudinal furrows.

*Distribution* (Fig. 30). Known from Alajuela, Costa Rica, and western Chiriquí, Panama, at 1,000–2,200 m elevation in regions of low montane rainforest with equatorial-mountainous climate. *Psychotria stockwellii* has been collected in flower January–October, primarily January–March, with immature fruit July–October, and in fruit January–March.

*Additional specimens examined.* COSTA RICA. ALAJUELA: region of Zarcero, 1,800 m, 18 Jan. 1937 (fl), *A. Smith 165* (F, MO). PANAMA. CHIRIQUÍ: Las Nubes, ca. 2,000 m, 7 Aug. 1974 (fl, early fr), *Croat 26450* (MO); Bajo Chorro, 1,800 m, 22 Jan. 1938 (fl), *Davidson 172* (F, MO); 2 Mar. 1938 (fl, fr), *M. Davidson 363* (A, F, MO); end of rd. to Bajo Mono, 21 Mar. 1977 (fl), *Folsom et al. 2250* (MO); E slopes of Cerro Pando, 8°55'N, 82°44'W, 2,000–2,300 m, 15 Oct. 1981 (fr), *Knapp 1646* (MO); vic. Las Nubes, 2.7 mi. NW of Río Chiriquí Viejo W of Cerro Punta, 2,200 m, 27 Feb. 1973 (fl, fr), *Liesner 293* (F, MO—2 sheets, NY); Las Nubes, 5 km NW of Cerro Punta, 1,800–1,950 m, 19 July 1975 (early fr), *Mori & Bolten 7240* (MO—2 sheets); Cerro Pando, nr. Panama–Costa Rica border, 2,000–2,482 m, 21 July 1975 (fl, early fr), *Mori & Bolten 7328* (MO, US); NW side of Cerro Punta beyond Las Nubes, 2,250 m, 15 Jan. 1971 (fl, fr), *Wilbur et al. 13211* (DUKE—2 sheets, MO); above San Ramón nr.

Bajo Mono, 4 mi. NW of Boquete, 1,800 m, 22 Jan. 1971 (fl, fr), *Wilbur et al. 13544* (DUKE).

*Psychotria stockwellii* may be recognized readily by its inflorescence, whose secondary axes diverge over 90° from the main axis and whose tertiary axes diverge likewise from the secondary axes, and so forth, a character state unique in the subgenus. In addition, *P. stockwellii* differs from *P. panamensis* in having a larger corolla tube (4–5 vs. 2–3 mm long), long-pedunculate inflorescences, and conspicuous to evident (vs. inconspicuous) tertiary veins.

Reproductive organs at both levels are longer in the pin morph than in the thrum.

**47. *Psychotria trichotoma*** M. Martens & Galeotti, Bull. Acad. Roy. Sci. Bruxelles 11: 227. 1844. *Uragoga trichotoma* (M. Martens & Galeotti) Kuntze, Revis. Gen. Pl. 2: 963. 1891. TYPE: Mexico. Veracruz: Jalapa et Mirador, 900–1,200 m, Aug. 1840 (fl), *Galeotti 7092* (holotype, G, n.v., photo, MO). Figure 31.

*Shrub* or small tree 1.5–6 m tall; young stems glabrous or rarely minutely puberulent, the bark smooth or longitudinally furrowed; stipules sheathing, lanceolate, (10–)20–30 × 3–5 mm, glabrous, caducous, leaving a pale ridge with red-brown fringe. *Leaves* petiolate; petioles 1–4(–5.5) cm long, glabrous, flat above; blades membranous, ovate to elliptic, the apex acuminate, the base attenuate to cuneate, (10.5–)13–23(–26) × (5.5–)6.5–12(–15) cm, glabrous above and below, drying usually green-brown or sometimes red-brown, the veins usually drying paler; secondary veins (12–)14–18(–20) pairs, diverging 45°–60°, brochidodromous with secondary loops near margin, straight or sometimes slightly arcuate, elevated below, glabrous, the axils lacking domatia or hairs; tertiary veins evident to inconspicuous, orthogonal reticulate to percurrent. *Inflorescences* terminal or pseudoaxillary, panicles of cymes: panicle branched to 4–5 degrees; main axis (4–)7–16 cm long, the peduncle usually absent or 5–9 cm long; secondary axes in 5–7 ranks, the first-rank axes 2(4), equal, 4–8.5 cm long, the second-rank axes 2, 2–4.5 cm long, the third-rank axes 2, 1–3 cm long, the fourth-rank axes 2, 0.5–1.5 cm long, the fifth-rank axes 2, 0.2–1 cm long, the sixth-rank axes 2, 0.3–0.4 cm long, the seventh-rank axes 2, 0.2 cm long; cymes branched to (1)2 degrees; bracts and bracteoles not evident. *Flowers* pedicellate, the pedicels 0.5–1 mm long; calyx cup-shaped, the tube 0.2–0.5 mm long, the lobes (4)5, trian-



gular to barely evident, glabrous; corolla white, the tube cylindrical,  $2.5 \times 1.5$  mm, white pubescent in throat, the lobes (4)5, lanceolate,  $2-2.5 \times 1$  mm; stamens (4)5, the filaments 2–2.5 mm long in pins, 3–3.5 mm long in thrums, the anthers 0.8–1.3 mm long; style 4 mm long in pins, 2 mm long in thrums, the branches short. *Fruit* when dry obovoid, (5–)6–8 mm long, (4–)4.5–5.5 mm diam., maturing red, drying usually black or sometimes red-brown; persistent calyx inconspicuous or a broad beak ca. 0.5 mm long; seed dorsal surface with 4–5 irregular often plus several irregular shallow longitudinal furrows, the ventral surface with 2 deep regular and often 2–4 irregular longitudinal furrows.

*Distribution* (Fig. 31). Southern Mexico through Nicaragua, at 100–1,600 m elevation in regions of mostly evergreen forest with usually tropical-mountainous climate. *Psychotria trichotoma* occurs also in Venezuela and Ecuador. It has been collected in flower April–July and December–January, and in fruit throughout the year, primarily August–March.

*Selected specimens examined.* MEXICO. CHIAPAS: Mpio. Solusuchiapa, 3–5 km above Solusuchiapa along rd. to Tapilula, 450 m, 26 July 1972 (fl), *Breedlove 26461* (ENCB, MEXU, MO); Mpio. Ocosingo, adjacent to Laguna Ocotol Grande, 800 m, 6 Feb. 1973 (fr), *Breedlove 33093* (MEXU, MO); Mpio. Cintalapa de Figueroa, nr. microwave station of La Mina, 12 km S of Hwy. 190 nr. Rizo de Oro, 1,000 m, 16 Oct. 1971 (fr), *Breedlove & Thorne 20640* (MEXU, MO, NY); Mpio. Mapastepec, along Río Testecapa 10 km SE of Mapastepec, 180 m, 24 Dec. 1972 (fl), *Breedlove & Thorne 30660* (MEXU); Escuintla, Esperanza, 14 Apr. 1947 (fl), *Matuda 16461* (F, MEXU); nr. Tumbala, 1,200–1,650 m, 20 Oct. 1895 (fr), *E. Nelson 3299* (F, US). JALISCO: W of San Sebastian, Hda. del Ototal, Arroyo de los Palos Blancos, 1,500 m, 9 Mar. 1927 (fr), *Mexia 1846* (A, F, GH, MO, NY, US). OAXACA: Dto. de Putla, 3 km al NE de Putla, sobre el Río Cuchara, 970 m, 20 June 1982 (fl), *Cedillo & Torres 1487* (ENCB, MEXU, MO); Dto. Cuicatlán, De La Raya al Faro, 600 m, 4 Nov. 1919 (fr), *Conzatti 3807* (GH, US); Tuxtepec, Chiltepec, 12 June 1965 (fl), *G. Martínez C. 34* (ENCB, MEXU, MO, NY); Dto. Choapan (Santiago Choapan), Monte Negro de Lalana,  $17^{\circ}32'N$ ,  $95^{\circ}40'W$ , 150 m, 3 May 1939 (fl), *Schultes & Reko 757* (F). TABASCO: Nacajuca, a 6 km carret. a Tecoluta, 26 m, 9 Oct. 1978 (fr), *Calzada 4965* (ENCB, MEXU); Mpio. Huimanguillo, km 12.6 de la desviación de Huimanguillo hacia Francisco Rueda, 10 Oct. 1980 (fr), *Cowan & Magaña 3267* (ENCB, MEXU); Mpio. Macuspana, along Arroyo Hular, S of Macuspana, 28 Sep. 1944 (fr), *Gilly & E. Hernández X. 339* (GH, MEXU); a 11.5 km de Villahermosa, por la carret. a Escárcega, 18 Jan. 1966 (fr), *González & Pérez P-546* (ENCB). VERACRUZ: Mpio. Huatusco, entre “La Victoria” y Chavaxtla,  $19^{\circ}09'N$ ,  $96^{\circ}53'W$ , 650 m, 3 Oct. 1979 (fr), *Avendaño & Calzada 516* (ENCB, F, MEXU);

Teocelo, El Olmo, 11 Oct. 1980 (fr), *Barrera et al. 298* (MEXU); Mpio. Hidalgotitlán, Benito Juárez segundo,  $17^{\circ}47'N$ ,  $94^{\circ}39'W$ , 100 m, 2 Nov. 1978 (fr), *Castillo 358* (F); km 3 carret. Playa Vicente a Santa Cecilia, 6 Oct. 1971 (fr), *Chavelas et al. ES-4245* (MEXU); orillas de la Laguna de Catemaco, camino a Coyame, 14 Apr. 1969 (fr), *Nevling & Gómez-Pompa 903* (F, GH, MEXU); swamps nr. Jalapa, 1,200 m, 19 May 1899 (fl, fr), *Pringle 8198* (A, F, GH, K, MEXU—2 sheets, MO, NY, US—2 sheets); Mpio. Hidalgotitlán, brecha Hermanos Cedillo–La Escuadra,  $17^{\circ}17'N$ ,  $94^{\circ}38'W$ , 150 m, 3 June 1974 (fl), *M. Vázquez et al. 779* (ENCB, F, MEXU); Zongolica, por el camino a Zongolica a Nacaxtla, 1,610 m, 10 Nov. 1976 (fr), *V. Vázquez T. 541* (ENCB—2 sheets); Mpio. Atzalan, Napoala, 950 m, 23 Nov. 1969 (fr), *Ventura 103* (ENCB); Mpio. de Totutla, el Mirador, 1,000 m, 3 May 1976 (fl, fr), *Ventura 12723* (MEXU). GUATEMALA. ALTA VERAPAZ: nr. Finca Sepacuite, 9 Apr. 1902 (st), *Cook & Griggs 540* (US). ESCUINTLA: Río Guacalata, 600 m, 16 Dec. 1938 (fr), *Standley 60207* (F). SUCHITEPÉQUEZ: nr. Santo Domingo, S of Mazatenango, 300 m, 5 Mar. 1941 (fr), *Standley 88882* (F). HONDURAS. COPÁN: cerca de Dulce Nobre, 1,200 m, 30 Mar. 1963 (fr), *A. Molina R. 11760* (F—2 sheets). OLANCHO: Montaña del Chifringó, 20 km S de Campamento, 1,000 m, 6 Sep. 1979 (fr), *C. Nelson 5339* (TEFH). NICARAGUA. BOACO: entre Cerro Alegre y el Roblar, San José de los Remates,  $12^{\circ}36'N$ ,  $85^{\circ}43'W$ , ca. 1,000 m, 11 Feb. 1983 (fr), *P. P. Moreno 20193* (MO); summit and upper SW slope of Cerro Mombachito,  $12^{\circ}24'N$ ,  $85^{\circ}33'W$ , 950–1,020 m, 18 Jan. 1981 (fr), *W. D. Stevens & Hahn 18943* (MO). JINOTEGA: along rd. from Hwy. 3 to La Fundadora,  $13^{\circ}03'N$ ,  $85^{\circ}54'W$ , 1,200–1,400 m, 31 Oct. 1979 (fr), *W. D. Stevens & Grijalva 15443* (MO). MANAGUA: ca. 5.4 km NE of El Crucero, ridge of Sierra de Managua nr. Hda. Palmira,  $12^{\circ}01'N$ ,  $86^{\circ}16'W$ , 800–900 m, 25 Aug. 1977 (fr), *W. D. Stevens 3466* (MO). MATAGALPA: camino al Cerro La Carlota, a 2 km de la carret. al Tuma,  $12^{\circ}58'N$ ,  $85^{\circ}52'W$ , 1,040–1,100 m, 5 Mar. 1982 (fr), *P. P. Moreno 15666* (MO); ridge along rd. between La Danta and La Luna, E of Esquipulas,  $12^{\circ}40'N$ ,  $85^{\circ}43'W$ , 960–1,000 m, 25 Jan. 1979 (fr), *W. D. Stevens 11801* (MO); Macizos de Peñas Blancas, drainage of Qda. El Quebradón, slopes N and W of Hda. San Martín,  $13^{\circ}14-15'N$ ,  $85^{\circ}38-39'W$ , 1,000–1,400 m, 18–20 Jan. 1982 (fr), *W. D. Stevens et al. 21144a* (MO); rd. to La Fundadora, N of Sta. María de Ostuma, 1,300–1,500 m, Feb. 1963 (fr), *L. O. Williams et al. 24803* (GH, NY, US). ZELAYA: El Hormiguero, caño above camp,  $13^{\circ}45'N$ ,  $84^{\circ}59'W$ , 800–1,000 m, 17 Mar. 1980 (fr), *Pipoly 6182* (MO).

The name *Psychotria trichotoma* has been used to misidentify specimens of most of the species in Group 6 plus *P. tenuifolia*, *P. limonensis*, *P. carthagenensis*, *P. quinqueradiata*, and *P. chagrensis*.

*Psychotria trichotoma* may be recognized by its fairly wide (length/width = 2) leaf blades drying usually green-brown with veins drying paler; secondaries usually 14–18 pairs, straight and making arches near margin; large inflorescences (usually 7–16 cm long) with no peduncle; and large (usually



6–8 mm long) obovoid fruit often drying black. The pedunculate inflorescences are found in some material from Oaxaca and Veracruz, Mexico, where the basal secondary axes may have been aborted.

Specimens from Oaxaca show also minute pubescence on the inflorescence axes.

Reproductive organs at both levels are longer in the pin morph than in the thrum.